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HAMILTON, THE BIRMINGHAM OF CANADA

A Progressive City—Well Governed—Clean and Well Paved Streets—Owns Its Water Works —Has Efficient Sewage Disposal Plant

By Our Special Correspondent

THE city of Hamilton, Ontario, has been called "The Birmingham of Canada." It had its beginning early in the last century. According to a local historian, the municipality was organized shortly after the close of the American Revolution, and its first citizens were composed of refugees from the United States, who preferred to remain under the British flag, and gave up their lands and homes to migrate to Canada. Because of their loyalty, two hundred acres of land in this rich province were granted free to every one of these "united empire royalists," as they were called.

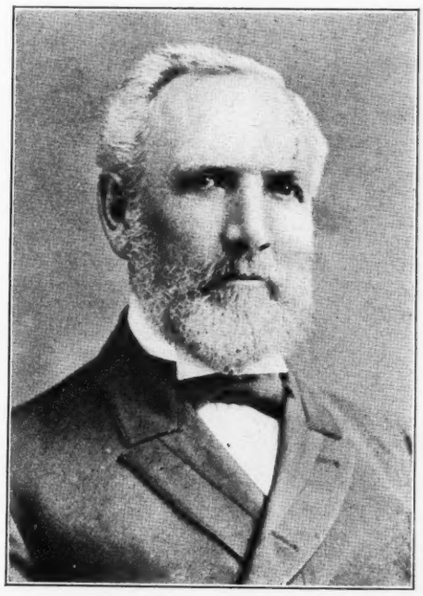
SETTLED BY REFUGEES FROM THE UNITED STATES

Among other settlers, there came into the province in 1813, in this vicinity, one George Hamilton, who taking a longer look into the future than his neighbors, presently laid out his fine farm in village lots, and so not only founded a fortune, but immortalized himself, for the town that grew up thought it could not do better than take his name.

From this small beginning, it has grown to be the fifth city in the Dominion, with a population of 52,634, according to the census of Canada in 1901. It is an ambitious city, and takes first rank, from the commercial and industrial standpoint, among Canadian cities. For this reason, it has some right to be called the "Birmingham of the Dominion."

Within the memory of men still living, Hamilton has been transformed from forest wilds into a modern city. Its manufacturing interests have multiplied during the last decade, and it now justly claims to be the "hub" of electrical power in Canada. The power required to operate its street railways, for the illumination of streets and houses, and for the operation of manufacturies, is obtained at Decew's Falls, where the Beaver River flows over the Niagara escarpment, and when the power-houses now being constructed at Niagara Falls are completed, Hamilton will be the first of the large cities of Canada to enjoy their advantages.

Hamilton is a well governed city. It is under the control of a mayor, and twenty-one aldermen elected annually. The present mayor, Mr. Wellington J. Morden, has already given to the city twelve years of faithful and efficient service as an alderman when he was chosen to fill the higher office. The city is fortunate in securing the services of one, who, by his long training, is so eminently qualified to bear the responsibilities of the position of mayor.



WELLINGTON J. MORDEN, MAYOR

The growth of the city has been very gratifying. In the year 1874, the value of the total assessable property was $13,850,000, and the taxation thereon was $263,150. Ten years later, the total assessable value of property aggregated $18,318,000, and the taxes were $348,148. At the close of another decade, the assessable value of property amounted to $24,691,000, and the taxes had increased to $491,000. At the present time, the population is estimated at 54,035; the assessable property is valued at $26,910,000, and the taxes amount to $539,266.

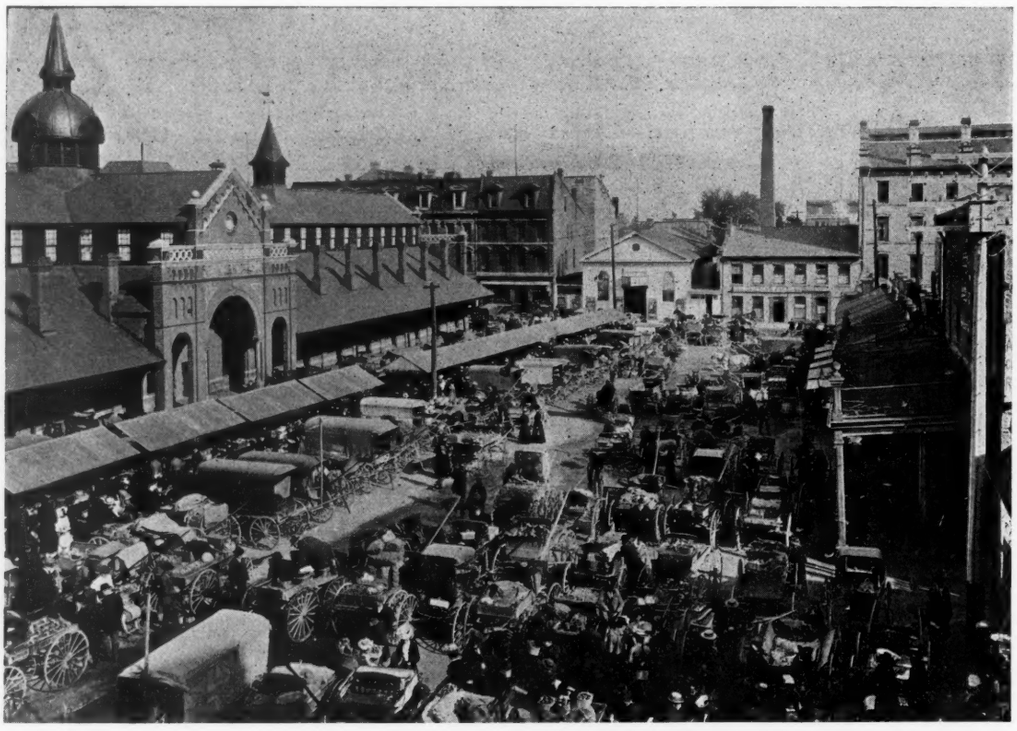
WELL PAVED STREETS

There are two hundred and two miles of streets within the city limits, most of which have been improved. The work of laying many of the pavements, and their maintenance, is performed under what is known as the "day labor system." The city engineer has charge of this department, but he is practically subordinate to the councilmanic committee, as the council determines who shall be employed by the city, and whether the work shall be performed by contract or under the "day labor system," and also fixes the standard of wages.

The waterworks are under the supervision of the board of public works. The source of supply is Lake Ontario, and the intake is located far enough out from the shore to prevent contamination by sewage. It is pumped into large settling reservoirs, which are located in Reservoir Park, on the side of the mountain, at an elevation of two hundred feet above the level of the center of the city, which gives an adequate pressure for both fire protection and domestic service. The water supply is considered of the purest and excellent in quality. The capacity of the pumping works is 13,000,000 gallons per day. There are ninety-nine miles of water mains in the system of distribution. While meters have been used on manufacturing plants, they

have not been employed on domestic and general public services, consequently it has been recently discovered that there has been a large amount of water wasted. The more general use of meters on domestic services has been strongly advocated. The pumping capacity would allow two hundred and forty gallons per day to each inhabitant, which is three times the amount that should be used, for eighty gallons per capita is a very liberal allowance, even in a manufacturing city, for a well managed water department. There are many cities in New England, which have as many manufacturing industries, that use much less than eighty gallons per capita per day, and some of them not more than half that amount.

The civic authorities of Hamilton cannot do better than invest a reasonable amount in meters annually, and install them at the city's expense, the same to be rented to the consumer at an annual rental of $2, with a minimum charge of $6 per year, including the rental, for water service, and not to exceed twenty cents per thousand gallons for water used in excess of the minimum charge. Of course, a much lower rate should be made for manufacturing purposes and to large consumers. This would reduce the operating expenses of the plant, and remove to a more distant day the necessity for enlarging the pumping capacity.



CITY MARKET OF HAMILTON ON A BUSY DAY *

A Fine Sewage Disposal Plant

The city has made a fair beginning in the installation of a sanitary sewer system, more than sixty miles of sewers having been laid. It has one unique feature, namely, a sewage disposal plant. In this particular, it affords an example that might well be followed by Toronto, Montreal, Winnipeg, and other Canadian cities—American cities, as well, might profit by Hamilton's example. Instead of permitting its sewage to pollute the waters of the beautiful bay near by, the sewage is first conveyed to the disposal works, situated on the bay shore, where it is chemically treated, and all solid and objectionable matter removed before it is allowed to flow into the bay. This sewage disposal plant cost the city about $85,000, and has been in operation three or four years.

Like many American cities, Hamilton has a good system of markets. The general market is said to be largest and best in the Dominion. It has an area of about two acres, and is located at the rear of the City Hall. In addition to a fine bulding three hundred feet long, it has ample room for the wagons of the farmers, who bring in their produce from the surrounding country. Special locations are assigned for meats and game, vegetables, grains, hay, fruit and flowers. Tuesdays, Thursdays and Saturdays are known as "market days" in Hamilton. One of the accompanying illustrations shows the City Hall Market on one of its busy days.

The city is well supplied with parks, the Dundurn Castle and Park being the largest of the nine parks which cover an aggregate area of ninety-six acres. There is an enthusiastic civic improvement organization, whose members co-operate with the city officials in keeping the parks, streets, school-grounds, and other public places in a reasonable condition of order and cleanliness. It has performed notable work among the public school children.

The municipality is well lighted with gas and electric lamps. It is lighted by a private company whose franchise expires in 1948, at which time the city may assume ownership, provided it gives six months' notice prior to the expiration of the franchise term, the value of the plant at that time to be determined by arbitration. The operation of this private plant, however, is hedged about by conditions which place it practically under the control of the city, so that it can protect itself from exorbitant charges. At the present time, it pays $80 per year per arc lamp of 2,000 candle power. The company pays taxes on a realty valuation of $170,000. It also pays $1 per year for every electric light pole erected within the city limits, and in various other ways contributes to the revenue of the city.

Low Rates Charged for Telephones

The other public service corporations, such as street railway, telephone and telegraph companies, give good service, but those which have secured their franchise privileges during the past five years have profited less at the expense of the city. While the Bell Telephone Company was recently granted an exclusive franchise for a period of five years, and certain other privileges, the city exacts the payment of $2,900 per year, besides taxes on the company's property. In addition, the company maintains, at its own expense, the poles and wires used in connection with the Police Patrol System

* This view and the four others which follow are here reproduced by the courtesy of the *National Monthly*, of Canada, Toronto, Canada.—[EDITOR.

at present in use, or as it may be extended, the city to supply the new wire any poles that may be required for such maintenance and repairs. The company also permits the city to use, free of charge, for the city's fire alarm wires, the top cross-arm on every pole now standing, or which may be hereafter put up or replaced by the company. The city has looked out for the interests of the patrons of the telephone line by requiring the installation of the best line equipment, instruments, etc., all of which must be completed and in operation on and from the first day of January, 1904. The rates for telephone service have also been fixed by the city, and the company is not allowed to charge more than $45 per year for unlimited service for business 'phones, nor more than $30 per year for unlimited service for house 'phones, and proportionately low rates for party lines. There are few cities of the size of Hamilton in the United States that enjoy the privileges of such low telephone rates.

All things considered, there is no better governed city in the Dominion of Canada than this "ambitious city" of the Province of Ontario. Its streets are wide, straight, regular and comparatively well paved, which are flanked by rows of beautiful shade trees. Its public buildings, charitable institutions, industries, parks, and school system are of the best and would be a credit to many larger cities.

POPLAR AVENUE, HAMILTON

BRICK PAVEMENTS*

Brief Description of Their Origin and Qualities—Hardness, Toughness and Strength—Homogeneity and Uniformity—Imperviousness to Moisture and Density

By George W. Tilson, C. E.

Cross-breaking Test

This test is made for the purpose of showing the tensile strength of the brick. This examination was also made by Mr. Harrington, and the commission after considering his report adopted the following specifications for the standard method of executing the cross-breaking test of paving-brick:

"1. Support the brick on edge, or as laid in a pavement, on a hardened steel knife rounded longitudinally to the radius of 12 inches, and transversely to the radius of 1/8 inch, and bolted in position so that the screw-span of 6 inches applied to load in the middle of the top shall pass through the steel knife-edge, straight, longitudinal, and rounded transversely to a radius of 1/16 inch.

"2. Apply the load to the middle of the top face through a hardened steel knife-edge, straight, longitudinally, and rounded transversely to a radius of 1/16 inch.

"3. Apply the load in a uniform rate of increase until fracture ensues.

"4. Complete the modulus of rupture by the formula

$$F = \frac{3WL}{2BD^2}$$

in which F = modulus of rupture in pounds per square inch; W = the total brick load in pounds; L = the length of span in inches, 6; B = breadth of brick in inches; D = depth of brick in inches.

"5. Samples for test must be free from all visible irregularities of surface or deformities in shape, and their upper and lower faces must be practically parallel.

"6. Not less than ten brick shall be broken, and the average of all is to be taken for the standard test."

The following passage is quoted from one place in Mr. Harrington's report:

"Cross-breaking test of paving-brick is made for the following reasons:

"1. It furnishes the means of comparing the differences of various kinds of clay paving material.

"2. For any particular kind of brick it shows whether the brick has been properly treated in the various stages of its manufacture.

* This is the third of a series of four articles on "Brick Pavements," by Mr. George W. Tillson, Chief Engineer of the Borough of Brooklyn. It is a reprint of the chapter on that subject from his valuable work on "Street Pavements and Paving Materials," published by John Wiley and Sons, New York. The complete work has 532 pages, octavo in size, bound in cloth, and sells for $4.00. —[Editor.

"3. It indicates the resistance of the material in cross-breaking when laid on beds of unyielding and uneven surface.

"4. The cross-section being exposed, the interior structure may be examined."

In order to obtain, if possible, whether any agreement could be traced between excellence in cross-breaking and excellence in the other tests, the facts in Table No. 69 were collected. The bricks used were all standard paving-bricks and are given in detail in the report. From this it will be seen that excellence in one test does not at all imply excellence in another. For instance, No. 6, which shows the least loss in the rattler test, has, with one exception, the largest amount of absorption, and has, with two exceptions, the lowest specific gravity.

The commission, after some discussion, agreed to pass a resolution leaving the test as permissible or optional with either engineer or maker, without condemning it unqualifiedly as had been done with the absorption test, but at the same time indicating the opinion of the body that the test was not important or especially trustworthy.

CRUSHING TEST

Prof. J. B. Johnson, of Washington University, presented the following specifications for the standard method of making the crushing test of paving-brick:

"1. The crushing test should be made of half-brick loaded edgewise, or as they are laid on the street. If the machine used is unable to crush the full half-brick, the area may be reduced by chipping off, keeping the form of a piece to be tested as nearly prismatic as possible. A machine of at least 100,000 lbs. capacity should be used, and the standard should not be reduced below 4 square inches area in cross-section at right angles to direction of load.

"2. The upper and lower surfaces should preferably be ground to true and parallel planes. If this is not done, they should be bedded in plaster of Paris while in the testing-machine, and should be allowed to harden ten minutes under weight of the crushing plane only before the load is applied.

"3. The load should be applied at a uniform rate of increase to the point of rupture.

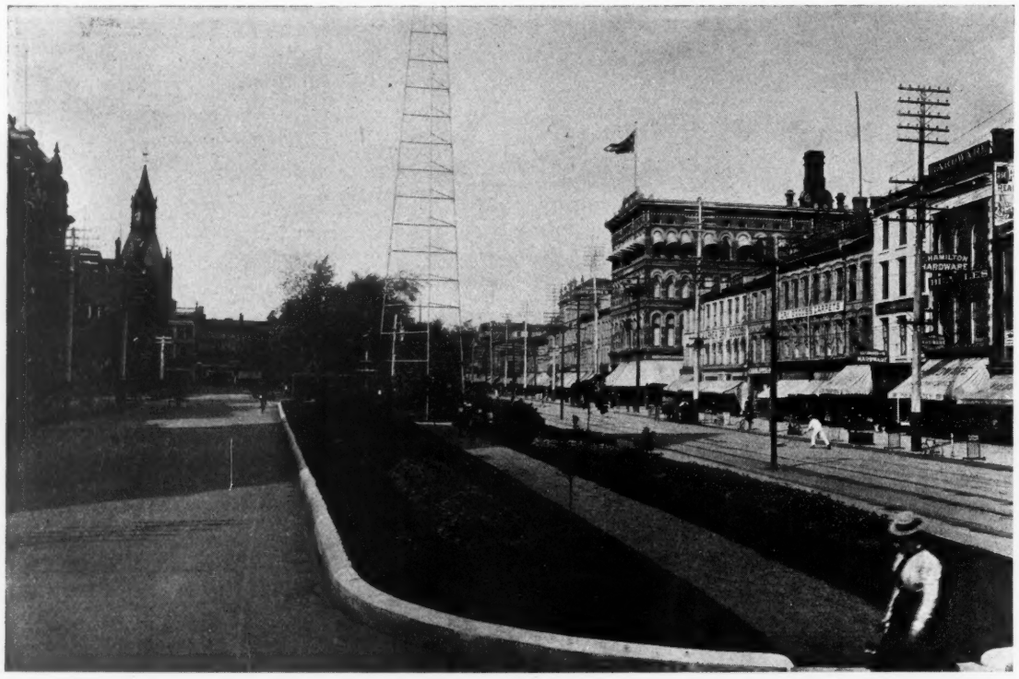
"4. Not less than the average obtained from five tests of five different bricks shall constitute a standard test."

These specifications were adopted unanimously.

After considerable discussion and consideration of data, the commission adopted the following:

"Whereas, from the experimental work done so far by this commission, or by others, so far as is known to us in the application of the cross-breaking machine tests to paving-bricks, it is not possible to show any close relationship between the qualities necessary for a good paving material and high structural strength as indicated by either of these tests,—

"Resolved, that for this reason the commission recommends that these tests shall be considered as purely optional in the examination of paving material, and not necessary as a proof of excellence."



THE GORE PARK EXTENSION, HAMILTON, ONTARIO

TABLE No. 69

Designation of Sample.	Clay Material Used.	Dimensions of Brick. Inches.	Per cent. Lost in Rattler Test.	Per cent. Gain in Absorption Test.	Specific Gravity.	Modulus of Rupture in Cross-breaking.
1	*	8 × 3¾ × 3	13.72	1.52	2.41	2669
2	*	8 × 4 × 2½	14.53	1.15	2.34	3663
3	*	8 × 4 × 2⅝	11.45	1.17	2.37	3619
4	*	8¼ × 4 × 2½	12.94	1.83	2.33	3498
5	*	8¾ × 4 × 3½	10.80	1.72	2.35	3104
6	†	9 × 4 × 3	9.86	4.09	2.24	2842
7	*	8 × 3¾ × 2½	18.98	2.05	2.33	2479
8	*	8 × 4 × 2½	13.34	0.92	2.41	3780
9	*	8 × 4 × 2½	10.12	1.05	2.36	3618
10	*	8 × 4 × 2½	12.74	1.85	2.28	2958
11	*	9 × 4 × 3	10.26	2.48	2.27	3056
12	†	9 × 4 × 3	11.95	2.86	2.22	2428
13	¶	8¼ × 4 × 2½	10.87	4.78	2.20	3221

* Shale. † Mixture. ¶ Fire-clay.

DESCRIPTION OF TESTS

Rattler.—Diameter of barrel, 24 inches; length, 21 inches. The chamber was filled to 15 per cent. of its volume, and the charge tumbled 40 minutes at 30 revolutions per minute.

Absorption.—Five rattled bricks were dried 48 hours and immersed 48 hours.

Specific Gravity.—From some samples used in the absorption test.

Cross-breaking.—Span, 6 inches. Average of 10 bricks broken on edge.

HARDNESS AND SPECIFIC GRAVITY

Mr. Harrington submitted data obtained from ten samples of paving-bricks showing the range of specific gravity from 2.19 up to 2.41, the majority being between 2.25 and 2.35. The hardness of a well-burned paving-brick has been proven to lie very close to 6 in Mohs' scale, and it is not possible by any known process of treatment to enable them to reach the hardness of 7. In consequence of the small range as measured in this scale, and the impossibility of suggesting or applying any other test for hardness, the commission considered this test of doubtful value. Consequently the following resolution was passed:

"Whereas, after careful consideration of all the data as to hardness and specific gravity accessible to the commission, no relation-

ship between these qualities and those necessary for good paving-brick can be shown to exist,—Therefore,

"Resolved, that the commission recommend that this test be abandoned as unnecessary."

Prof. Orton presented a paper to the National Brick Manufacturers' Association giving the results of an investigation of the effect of structure on the wearing power of paving-brick, and in a table accompanying it he showed the average loss to 106 end-cut bricks after 1,000 revolutions of the rattler to be 19.54 per cent., and after 2,000 revolutions of the rattler to be 27 per cent., and the average of side-cut bricks to be 24.43 per cent. after 1,000 revolutions, and 32.9 per cent. after 2,000 revolutions; that of 47 end-cut plain bricks made on four different machines in nine different tests the average loss was 21.05 per cent. after 1,000 revolutions, and 28.48 per cent. after 2,000 revolutions; and that of 59 end-cut repressed bricks the loss was 18.23 per cent. after 1,000 revolutions, and 26.67 per cent. after 2,000 revolutions. The average modulus of rupture for repressed bricks was 2,525, and for end-cut plain bricks 2,425. For side-cut repressed brick the average was 2,346.

KING STREET EAST, HAMILTON, ONTARIO

After having made all of the above tests and arrived at the results of each for any particular brick that may have been offered at any competition, it will be necessary to combine them properly in order to arrive at one result to designate the actual value of any particular result.

The Board of Public Improvements of St. Louis adopted formula 1, while Prof. J. B. Johnson advised formula 2, and Mr. H. A. Wheeler, of the Missouri Geological Survey, recommends No. 3, using the same factors as in the other two, and formula 4 when thetwo additional factors of specific gravity and hardness are used.

Formula 1. $V = \frac{10}{RG} + \frac{1}{4A} + \frac{T'}{2000} + \frac{C}{4000}$.

2. $V = (25 - R) + (3 - A) + \frac{T'}{1000} + \frac{C}{4000}$.

3 $V = (18 - R)6 + (7 - A)4 + \frac{T}{220} + \frac{C}{1000}$

4. $V = (18 - R)5 + (7 - A)2 + \frac{T}{220} + \frac{C}{1000} \div \frac{325 - D}{10} + \frac{10}{75 - H}$

Formulæ 1 and 2 are based on the following mean numerical values deduced from the St. Louis tests:

$R = 16.5$ per cent.
$RG = 4.7$ " "
$A = 1.25$ " "
$T' = 3{,}300$ pounds;
$C = 13{,}000$ "

In deducing mean values for formulæ 3 and 4 a study was made of tests from various parts of the country, from which 262 were selected for use, and they gave the following:

$R = 8$ per cent.;
$A = 2$ " "
$T = 2{,}200$ pounds;
$C = 10{,}000$ "
$D = 2.25$ "
$H = 6.5$ "

In which V = the required value; RG = the rattler loss in terms of granite; R = the rattler loss in percentage of the weight of the brick; A = per cent. of absorption of the weight of the brick; T = modulus of rupture per square inch; T' = the crushing strength per inch width; C = crushing strength per square inch; D = specific gravity; H = hardness by Mohs' scale.

Where the four factors, R, A, T, and C, only are used, Mr. Wheeler assigns the value of 60 per cent. to the rattler test and 50 per cent. where all the above factors are known, while Prof. Johnson assigns 50 and the Board of Public Improvements of St. Louis only 30 per cent. It is probable that the value of the rattler test is of even greater value than that assigned by Mr. Wheeler, and might reach 75 per cent., as no engineer would be willing to lay any brick in a pavement that had not passed a good test in the rattler.

Mr. Wheeler published a table in the book heretofore mentioned in which he shows the comparative ratings of two well-known paving-brick by the formulæ here given, in which the necessity of assigning the proper percentages to each factor is very clearly demonstrated to any one having a knowledge of these brick.

In Columbus, Ohio, it has been the practice to take one or more samples from each street of all brick used and test them by the rattler test as specified by the National Brick Manufacturers'

Association, calling as loss by abrasion all pieces of one pound weight, and less, aiming to admit on the streets only such brick as would show a loss of less than 27.5 per cent. by abrasion under this test.

A record for one test was for blocks selected in order as delivered by the contractor: charge No. 1, loss 18.55 per cent.; charge No. 2, loss 17.9 per cent.—average, 18.22 per cent.

At the same time, blocks which were slightly fire-cracked and which the inspector had rejected as unfit for use were tested with the following results: charge No. 1, loss 25.5 per cent.; charge No. 2, loss 24.25 per cent.—average, 24.87 per cent. Which is a somewhat better showing than was generally obtained, the best single charge being: loss, 15.4 per cent; average, 17.07 per cent.; and the highest being: loss, 36.65 per cent.; average, 33.56 per cent.

Size of Bricks

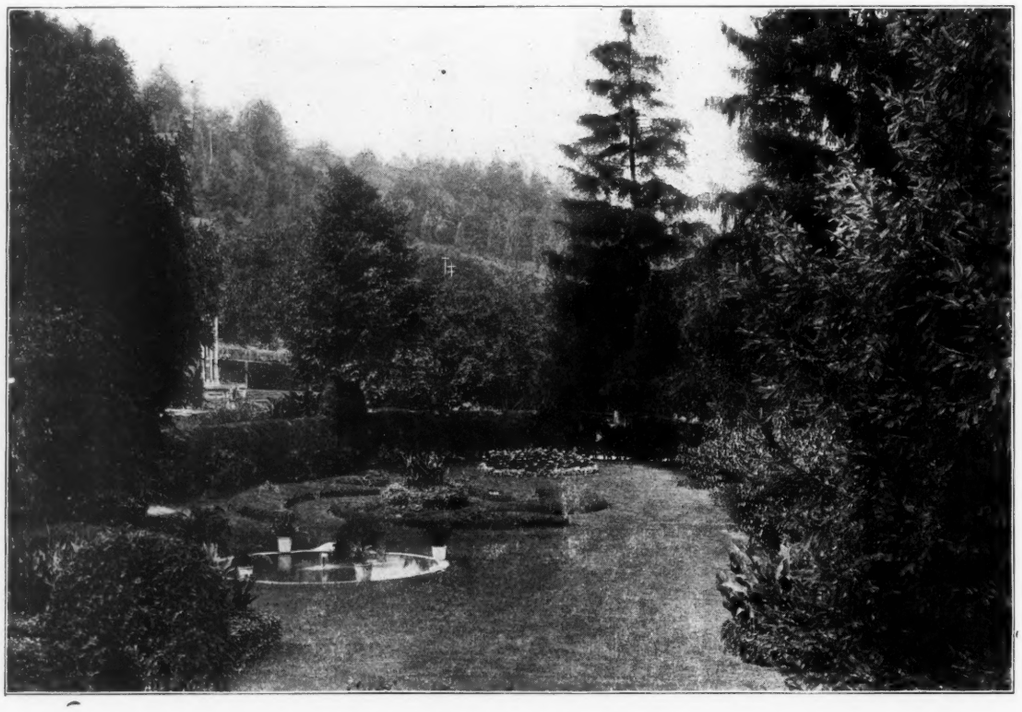
Paving-bricks have been made of very different shapes and sizes by different manufacturers. Other things being equal, the same principles laid down for establishing dimension of granite blocks would apply to sizes of paving-bricks; but it must be remembered that while the material of which the granite blocks are made is natural, that composing the bricks is artificial. Consequently new conditions arise, and in determining dimensions consideration must be given to the method of manufacture. If the brick is made too long, it is liable to warp either in the preliminary drying or while it is being burned in the kiln. If it is too thick, so that the clay in the interior is vitrified with difficulty, it is probable that when sufficient heat has been applied to insure proper vitrification to the central part of the brick, the outside will have been damaged and the brick not of uniform texture throughout, so that in determining the thickness the same rule will not apply to all clays, as some clays will vitrify more readily than others. But a thickness must be adopted for any particular clay which will admit of complete vitrification at a temperature which will not injure any portion of the brick.

Then, too, apart from the physical conditions governing the size, the economic reasons must be considered. If brick are made of an unnatural size as compared to building-brick, underburned brick, which are always found in greater or less extent in every kiln of paving-brick, will be almost a total loss, as they can be used to very little advantage for any other purpose; while if of about the standard size of building-brick, the soft brick can always be disposed of to builders without loss.

Bricks have been made, however, and used in pavements, having dimensions as large as $4 \times 5 \times 12$ inches, but for the above and other reasons their use has been discontinued, and at the present time smaller sizes are adopted. Many manufacturers make two sizes, the smaller being practically $2\frac{1}{2} \times 4 \times 8\frac{1}{2}$ inches, and the larger $3 \times 4 \times 9$ inches. These latter are generally termed blocks in distinction from the smaller size.

Form of the Brick

Whether the bricks should be made rectangular in shape or whether the corners should be rounded off is a mooted question. The argument used by the advocates of the round corner is that if the brick are laid with square edges, the impact of the horses' shoes soon wears them off practically to the round corners, leaving them in a rougher and much worse condition than if they had been originally made round. There is considerable merit in this argument, and if the joints are to be filled with sand or some unstable filler, it is probably the best shape; but if the joint-filler is rigid, like Portland cement or some similar filler, so that the joints can be filled solidly to the top and so maintained, it would seem that the square-edged brick would give better results. With the rounded corner and the joints filled only to the top of the brick a thin edge of the filler must be made at each side of the joint, which is maintained with difficulty under traffic. It has not been definitely determined by manufacturers which is the better method.



RESERVOIR PARK, HAMILTON, ONTARIO

Different devices have been adopted for keeping the bricks at a certain distance from each other in a pavement, so that the space may be left sufficiently wide to admit of enough filling material to make a good and substantial joint. Some blocks have a projection on one side to maintain the distance, and a groove on the other side to receive the joint-filling material. It is a well-known fact that, whatever the material composing blocks for pavements, the smaller the amount of joint-space the better. It would seem, therefore, that it was hardly necessary to provide any special arrangement for keeping the brick apart. It has been the author's experience that where the brick were apparently laid tight in the work, when they came to be rammed or rolled sufficient space would be

found to receive the proper amount of joint-filler. Upon this question of size and shape the Philadelphia specifications say:

"The bricks or blocks must be vitrified clay, repressed, especially burned for street-paving, and not less than 9 inches long, 4 inches wide and 3 inches thick. The bricks or blocks must have two or more ribs or projections upon one of the vertical sides extending from top to bottom. On the opposite vertical side of the brick or block [there should be] a groove or channel extending longitudinally from end to end of the brick or block, and connecting with the like transverse groove extending across each end, thus serving by contact with the flat side of an adjoining brick or block to secure a separation, so that cementing material may effect a practical encircling of each brick or block, flowing into the grooves, thus keying or locking together the entire pavement. The Department of Public Works is authorized, however, to accept proposals for street-paving with other vitrified brick, provided they shall be in quality not inferior to those herein described."

St. Louis specifications say: "The brick shall not be less than 8 inches nor more than 9 inches long, not less than 2½ inches nor more than 4 inches wide, not less than 4 inches nor more than 4½ inches deep, with rounded edges of a radius of 3/8 of an inch. Said brick shall be of the kind known as repressed brick, and shall be repressed to produce a mass free from internal flaws, cracks, or laminations."

(*Concluded in the December number.*)

MUNICIPAL TELEPHONES

Successful Operation in European and English Cities—At Much Lower Rates Than Afforded by the American Monopoly

By J. F. Hemenway *

STOCKHOLM is sometimes called the best telephoned city in the world because of the large number of telephones in use as compared with the number of inhabitants. At the present time, there is about one telephone to eight people, or 40,000 instruments and 300,000 inhabitants. Telephones have been made in Sweden since the early days of the industry, and because the patents restricted their manufacture here, the Swedish make has found its way to every known country of the globe. In Sweden and Norway, the long distance telephone lines are owned by the government, which also controls the railroads and telegraph. In Stockholm and immediate vicinity, the older company, called the Almanna or General Telephone Company, is still in existance and has, by far, the largest number of telephones in use in its own field. The Riks, or government telephone system, operates the long distance lines from Stockholm throughout Sweden and Norway, and also the exchanges in all other cities; but in Stockholm and vicinity it has very many less instruments in use than the Almanna.

In some of the other countries in Europe, notably Germany and France, the exchanges and long distance lines are entirely in the hands of the government, and only the telephones made in each country can be sold for use in that country; as a result, some of the telephones appear very strange to the foreigner, for instance in Germany, the instruments are about the same size as the ordinary telephones, and with the ordinary transmitter, but the receivers are of an enormous size, nearly as large as saucers and fully covering the ear. They are much heavier than our receivers, weighing two or three times as much, and each telephone has two receivers. Service in Germany is very bad, as can be imagined when two receivers are supplied for each telephone, which, in this country, would be considered entirely unnecessary. In order to be understood, one has frequently to shout and even then it is with difficulty that the conversation is carried on, especially at a distance. It is not uncommon in the smaller places to have the advice given you: "Take a cab, as it will save time and be so much more satisfactory than telephoning."

In France, a foreigner, in using the telephone, is very apt to wonder where the transmitter is and to look about for it. The telephone box is made very much like our ordinary instrument and has a small wooden shelf, such as we use for a paper pad, on which to make a note of the conversation. Strangers sometimes suppose that the shelf is for such a purpose, but strange to say, it forms the diaphram of the transmitter, and in talking, one talks right against the wooden shelf. Notwithstanding this peculiarity, the telephones in France give very fair service and have only one receiver.

In speaking of municipal telephones, it is only possible to refer to certain countries, as Great Britain and her colonies, Russia and Holland. Besides France and Germany, the governments control the telephone lines in Austria, Belgium, Greece, Switzerland and far-away Japan. In South America the telephone lines are practically all owned by private companies, and the same is true of Mexico. In the United States there have been no municipal telephone plants installed, although one was proposed by the officials of one of our cities, but later the project was taken up by the citizens of the place and a stock company formed. The nearest approach to a municipal plant at the present time is the co-operative company in Grand Rapids, Wisconsin, which put in metallic circuit and gives excellent service. No stock is sold except to renters, and only one $50 share per telephone, each subscriber being entitled to one share of stock for each telephone rented. The rates are $12 a year for residence and $27 a year for business telephones. The stock pays dividends of one per cent. a month, thus reducing the actual cost to the co-operators. The place has 4,500 inhabitants and there were 434 exchange lines in operation at the last report, the average cost of operation being less than $8 per telephone per year.

In the year 1899, Parliament empowered the municipalities of Great Britain to give telephone service under license from the Post Office. Among the first to embrace the opportunity thus offered was Glasgow, which began to give service in March, 1901, to 1,500 subscribers, the rates being $26.25 per annum, flat, or $17.50 per annum and in addition two cents for each outgoing call. The growth of this exchange has been rapid and there are now over 8,000 subscribers within and without the city. The wires are placed underground in the center of the city, with aerial cables and bare wires used elsewhere. The cost was about $150 per subscriber's line, including a large number of spare wires, provided in anticipation of a large increase in the number of subscribers. The service is said to be satisfactory, and the municipality has to compete with the older company, which is the only private telephone company in Great Britain.

A royalty of 10 per cent. of the gross receipts must be paid to the Post Office by the private company and the municipalities alike, and all telephone licenses are made to expire in 1911. The long distance lines are controlled by the Post Office, which connects with the local exchanges to give their subscribers long distance service.

The Island of Guernsey, with 40,000 inhabitants and an area of twenty-four square miles, has the oldest English municipal telephone system and gives service to over 1,100 subscribers. Beginning with a flat rate of $27.75 per annum, it was found possible to reduce it to $24.50, yet with satisfactory results financially and otherwise. The cost was approximately $90 per subscriber line.

The Tunbridge Wells Corporation equipped an exchange and gave service for almost two years in competition with the private company, selling out to the latter at a profit and securing a re-

* Mr. J. F. Hemenway is an authority on telephone matters and, at the request of Secretary MacVicar prepared this paper and read it before the seventh annual convention of the League of American Municipalities, held at Baltimore, Oct. 7-9, 1903.—[EDITOR.

duction in the rates formerly charged. It was claimed that the exchange was a financial success and that the sale was contrary to public policy but the sale was confirmed by the authorities.

Portsmouth, a town of nearly 200,000, began to give service through its municipal telephone system last December and its 1,240 subscribers' lines cost approximately $105 each. The rate is $29.30 per annum and it is said that orders are coming in rapidly. Other towns preparing to give service, or with exchanges in process of construction, are Hull, Brighton and Swansea, with Manchester and others considering the matter.

In Durban, South Africa, a town of 40,000 inhabitants, the municipality bought out the old company a year or two ago, and proposed to install a new up-to-date system, but no particulars are at hand at present.

In St. Petersburg, Russia, the system which was formerly operated by the International Bell, was taken over by the municipality in 1901. The rate charged by the Bell was $127.50 per annum, whereas the new rate charged by the municipality is $29.50 per annum. The installation is not metallic circuit. The service was and is very bad. When the old system was taken over from the Bell Company, there were 4,500 subscribers, and owing to the reduced rates, there has been a large demand for connections from new subscribers. The outside construction is good, and it is proposed to install a new system with all the wires underground, and full metallic circuit for each subscriber, no party lines being allowed, as this is called for in the franchise. This new underground system must be completed in 1905, and it is intended to build for 40,000 subscribers capacity and to have the latest improved common battery system. The government has built two copper circuit trunk lines between Moscow and St. Petersburg, which are operated by the St. Petersburg municipality, giving connections with Moscow, at the very reasonable charge of 25 cents for three minutes conversation. The peculiar character of the service in all Russian towns is, that it is impossible to give private service or to guarantee secrecy, as the police officials may listen at all times and to any conversation, and may use what they hear against the user of the telephone. Also, if they choose, they can, at any time, order the service to any subscriber discontinued.

Amsterdam, Holland, has one of the oldest municipal systems and is a city of 550,000 inhabitants. The municipality has conducted the telephone business for more than seven years, and at the present time has about 5,000 subscribers, using about 6,000 instruments. The investment here is about $180 per subscriber line, and the wires are partially under ground. A prospective subscriber must pay, at the time of signing the contract, what is called an entrance fee, of $10, and later the annual subscription, which is between $36 and $37 per year for unlimited service. The interurban lines are owned and controlled by the government, and for toll service, a charge is made according to the distance, of from 25 to 50 cents for three minutes' conversation. The expenses of the municipal plant at Amsterdam average about $26 per annum per subscriber. The income per subscriber is about $43.70, the net profit going to the reserve fund and for renewals, etc.

Rotterdam, a city of 350,000 inhabitants, also has a municipal system, and began to give service at about the same time as Amsterdam. There are 3,000 subscribers, using about 4,000 instruments, and the wires are placed partly underground. The cost was about $525,000. The entrance fee is $8.25 per subscriber and the rates are, for business, $36.75; for residence, $27 per annum for unlimited service.

Several smaller towns in Holland also have municipal systems, but these have been in operation for a shorter time. At Arnheim, a town of 58,000 inhabitants, with nearly 1,000 subscribers, the rate is $18.50 per annum. Maastricht, a town of 35,000 inhabitants, has 350 subscribers and the charges are: entrance fee, $4, annual charge, $18.50. In all cases, an additional charge is made for out-of-town connections, and if the subscriber lives beyond municipal limits, an additional charge is made for installing, the amount varying with the distance. This may be one fixed charge, or it may be an additional annual charge.

The full facts and figures from these systems are so mixed with other municipal items that the real results are hard to ascertain. That some will be greater successes than others there can be no doubt, as a telephone exchange, like any other business, must be conducted on business principles in order to succeed, and if the income is too small and expenses too large either the one must increase or the other decrease to succeed.

To show what is possible in the way of cheap service the Helsingfors' Telephone Association, in Helsingfors, Finland, is an excellent illustration. The place has 80,000 inhabitants and the telephone subscribers number 4,145. At the beginning, service by the Association was given in competition with the older company, but in 1901 it bought out the latter and connected the subscribers with its own central exchange. The annual rate for the subscribers is $30 but a member of the Association pays the cost of his line and instrument, $36, and an annual sum agreed upon at the meeting of the members, which, for 1903, is $12. Any subscriber has the choice of becoming a member or continuing to pay the regular subscription rate. For the year 1902, the average expense per subscriber was $13.25 and the average income $16.70, making a net profit of 4 per cent. on a capital of $368.000.

Extremely low toll charges are made in Denmark and in Sweden, varying from two cents to eight cents for three minutes' conversation, according to the distance. These rates are the same for subscribers and non-subscribers.

With regard to the cost of a telephone plant, the following estimates, taken from a careful comparison of estimates by others and from actual experience, are submitted:

An exchange of 500 to 600 subscribers, metallic circuit, aerial cable and bare iron wire, about $65 to $80 per instrument installed, including central office equipment.

An exchange of 2,000 numbers, metallic circuit, partly underground cable, aerial cable and bare iron wire, $100 to $125 per instrument installed, including central office equipment.

An exchange of 5,000 numbers, metallic circuit, underground cable in the business section of the city, aerial cable and bare iron wire, about $185 to $225 per instrument installed, including central office equipment, the larger or smaller cost depending upon the local conditions.

In neither case are included long distance, toll or farmers' lines.

From this it will be seen that, as the plant enlarges, the cost increases somewhat out of proportion, and this is due to the longer distance from the central office, larger area covered and the greater cost of equipment and installation.

In a large exchange, the cost for repairs and re-equipment will be out of proportion to a small exchange, because the instruments and central office equipment are used more, are not so carefully handled and outside construction is more liable to injury in a city than in a small town. The decrease in cost in a large exchange over a small one is per connection or per message, which is less, but the cost for service per instrument is greater because of the larger number of subscribers and therefore of the average daily connections.

Going one step further, it is estimated that the cost for operating exchanges of the capacity indicated would be about as follows:

A 600 subscriber exchange, the cost for maintenance will be about $3 per subscriber, and the expense will amount to about $6 per subscriber line, making a total average of $9 per subscriber line, per annum.

For an exchange of 2,000 subscribers installed, the maintenance will approximate $5 per subscriber line and the other expenses about $7, making a total of $12 average cost per subscriber line, per annum.

For an exchange of 5,000 subscribers installed the maintenance will be about $7 per subscriber line and the other expenses about $8, making a total of $15 per subscriber line, per annum.

This does not include interest on the invested capital or depreciation. The depreciation according to the American practice is about 7½ per cent., but experts in England, estimate the depreciation at only from 5 to 6 per cent. It is probable that 5 per cent. of the cost of a plant, at compound interest of not less than 5 per cent., kept as a sinking fund year by year, would fully cover depreciation in a well equipped system.

It is self-evident that the cost for maintenance will be less for a

new plant for the first few years, than later; and the estimates given are intended for an average covering a number of years.

No one will question that good equipment is of prime importance and will prove most economical in keeping down both the cost for maintenance and expenses.

Unfortunately the experience of the Independents in this country does not go back many years; there have been very few exchanges in operation for a longer period than five years, and the oldest not back of 1895 or '96.

The competition of the Independents has been of great advantage in reducing rates and improving the service. A comparison of old rates charged by the monopoly in four cities and new rates by Independents, will prove this.

In Philadelphia, the Bell rates before the Independents came in were: For a business place, $160; residence, $130. In the same place, rates made by the Independents are: For a business place, $80; residence, $48.

In St. Louis, the Bell rates before the Independents came in were: for a business place, $120; residence, $60. The rates made by the Independents are: $60 for a business place and $36 for residence.

In Indianapolis, the rates before the Independents came in were: $72 for a business place, $48 for residence. The rates made by the Independents are: $40 for a business place and $24 for residence.

In Rochester, the Bell rates before the Independents came in were $125 for a business place and $64 for residence. The rates made by the Independents are: $48 for a business place, and $24 for residence. From this it will be seen that the rates made by the Independents average less than half the rates formerly made by the Bell.

It is said that two companies in a city makes duplication necessary or that many business houses are obliged to have both 'phones. The result of competition by the Independents has been a reduction in the rates by the Bell, and if the two cost not too much more than the one did and, if the number of subscribers that can be reached on the two is larger than before, the advantage is with the business house, because of the larger number of customers within its reach. Again, with the two 'phones there is the advantage of using both at one time, which is frequently necessary and always convenient. Besides, if one line is busy, time can be saved by using the other instead of waiting.

Measured service is the means of reducing the average number of calls per subscriber and increasing the revenue. It makes every message pay and reduces the dead-head calls. It is better for the owner of the exchange rather than for the subscriber. Measured service is selling retail. Unlimited service is selling wholesale.

MUNICIPAL *vs.* CONTRACT CONSTRUCTION

The Advantages of the "Day Labor System" Over Contract Work—A Discussion Illustrated by Practical Results

By James M. Head *

In undertaking to point out the advantages of the municipal construction of all public works, over the commonly accepted practice of letting these works to the lowest responsible bidder, I am well aware that I am advocating a policy directly in conflict with the actual practice of the great majority of American cities. I am also aware that, while the theory of municipal construction, as opposed to the contract system, is unanswered and unanswerable, the actual results of its attempted application have not in every instance sustained the correctness of the theory. But the failure and final overthrow of every republic, which is recorded in the history of the world, did not deter our illustrious ancestors from again attempting to found a government which derives "all its just powers from the consent of the governed," or rob them of the belief that a government can be successfully maintained and operated in the interest of the whole people and not for the benefit of a favored few.

When the proposition is finally accepted that municipal governments are incapable of doing every class of public work cheaper and better than it can be done by letting the work to private contractors, then the failure of municipal government is conceded, and the inability of the people to govern themselves finally established.

An intelligent discussion of this question cannot be had without first determining, in a measure at least, what are the proper functions of municipal government.

As our federal government was originally organized, sovereignty was assumed to reside in the several states—counties and municipalities were considered as mere branches or arms of the state government, with no power or authority to do anything except what they are expressly authorized, or permitted to do by the state; and the federal government, itself a government of delegated powers, was limited and restricted in its functions by the federal constitution.

The absolute unequivocal and unresticted power of the state government over counties and municipalities is everywhere admitted.

When our Federal and State Governments were organized, the existence of a modern city was unthought of, and consequently all its proper functions were unknown. Who could have imagined, at the time of the adoption of the federal constitution, that within a little more than one hundred years the city of New York would have within its corporate limits more human beings than were then in all of the thirteen Colonies? Can it be possible, if such a condition could have been foreseen, that no provision would have been made for the self-government of this great city; that is, in all matters of purely a local nature?

The city of New York has a population of a little less than the remainder of the State, and yet its local affairs are largely controlled by men who do not live within its limits, and laws are made for their government which a majority of the people do not approve and do not want. The conditions existing in that city represent, in a greater or less degree, the condition of almost every city in the United States of more than 100,000 inhabitants.

It will not do to assume that all the duties of government have been discharged when life, liberty and property have been protected from the predatory depredations of the midnight prowler, the highway bandit, or the hereditary monarch. There are other menaces to the property, life, liberty and happiness of the people which it is as much the duty of government to provide against, as those of a more open and flagrant character.

Suppose, for instance, that in the early history of a great city, an individual or corporation obtained control of the only possible supply of water for the inhabitants of that city, and that, when the city grew to several times its former population, for some cause—satisfactory to themselves—the owners of the water supply should refuse to allow the inhabitants of the city to have water at any price, or should fix such a rate as would compel the people to pay four and five times as much as was reasonable, or that the water supply should become contaminated with typhoid fever germs, and no effort should be made to purify the supply, can there be any doubt as to the proper functions of government in such a case? And yet, under our municipal system of government, the inhabitants of that city would be compelled to do without water, or pay the price asked, or suffer from the typhoid contamination, until the legislature of the state could meet and authorize the city to issue the bonds to pay for, and then have conferred upon it the power to own and operate a water plant to supply its citizens with water.

Suppose, again, certain combinations of men and capital should

* Former Mayor of Nashville and President of the League of American Municipalities. Mr. Head read this paper before the seventh annual meeting of the League of American Municipalities, held at Baltimore, Oct. 7-9, 1903.—[Editor.

band themselves together, not for the purpose of playing the part of ordinary highwaymen, but for the purpose of owning and controlling the supply and means of transportation for the coal that is necessary to keep the people of one or more of the great cities of our country from freezing to death, and should either refuse to allow any coal to be mined, or brought to those cities in the dead or winter, or should exact the payment of bankrupt prices for this coal; can there be any doubt as to the proper functions of government under conditions of that kind? And yet, in the opinion of many great and good(?) men, neither the federal, state nor municipal governments have any power or authority in any way to protect the people against the depredations of these public enemies.

Suppose, again, that certain combinations or unions of individuals should be formed, whereby they agree neither to labor themselves nor allow anyone else to labor, unless they unite themselves with the organization to which they themselves belong; can there be any doubt as to the duties of the government in all such cases to protect every individual in his right to contract and be contracted with in all legitimate matters affecting his individual actions and conduct?

These instances are cited merely for the purpose of calling attention to what are, and what are not, the legitimate and proper functions of government; they are purely questions of fact, about which no hard and fast rule of law can be laid down; as they are dependent in every case, upon the peculiar conditions surrounding the city, the state or the nation at the time. In other words, it is a question of economy, or expediency, rather than a question of law, as to what are the proper functions of government under given conditions.

Municipal, or private ownership of public utilities, and municipal construction, or the letting of public works by contract, is, in every instance, a question of expediency, dependent upon the peculiar conditions which present themselves at the time the question is to be settled.

In other words, if the municipal or state government is, itself, under the domination and control of political bosses; and is not in fact, as well as in name, a government of, for and by the people, then municipal ownership or municipal construction, if attempted, is foreordained to failure; but if the government is itself in honest and fairly competent hands, it then becomes a question purely of extraneous conditions as to the advisability of undertaking the work.

If water, gas and electricity are being supplied to a city as a reasonable price, sufficient to pay a good dividend upon the actual cost of the plant and no more, which is rarely, if ever, the case; and if the managers of these quasi-public corporations understand the relation which they sustain to the public and their duties thereto, which is even more seldom the case; and if, when public improvements are to be made and contracts let, there is, in fact, as well as in name, competitive bidding, and not an agreement in advance amongst bidders to divide the public work to be done, which is usually the case; then, under such conditions, there is no necessity for public ownership of these utilities or municipal construction of public works. As none of these latter conditions exist, however, except in rare and exceptional cases, public ownership of all quasi-public corporations, and the municipal construction of all public improvements, offers the only possible solution of troubles arising from the private ownership of public utilities, and the combinations which are almost invariably formed to prevent the free, honest and open competition necessary to secure the best results from the contract system of letting public works.

I have referred to the municipal ownership of public utilities in connection with municipal construction of public works for the purpose of emphasizing the fact that governments are instituted for the purpose of securing the greatest good to the greatest number, and for showing that the rights of the whole people are always paramount to those of the individual.

Whenever, therefore, it becomes apparent that the parties engaged in street paving, for instance, have combined, or formed a trust, to practically control the paving industry, and fix a price that forces the several cities of the country to pay exorbitant and unreasonable prices for paving their streets, the time has come for municipalities to organize their own forces and build their own streets, even though it be temporarily at a greater cost than it could be done by private contract.

When, however, conditions arise, which make it necessary, or advisable, for a municipality to abandon the contract system and commence the construction of sewers or the building of streets, it should proceed upon well recognized lines, and prepare itself to do the work economically. The necessary plant should be acquired, a competent superintendent employed and placed in charge of the mechanical construction of the work under the carefully prepared plans and specifications of a competent engineering department, entirely separate and distinct from the construction department. In this way, responsibility for failures could be fixed and the highest efficiency obtained.

The objection most frequently urged, and generally with the greatest reason, against the policy of municipal construction, is that for some unaccountable reasons, most men who work for the public have not the same interest in their work, nor the same stimulus or inducement to do efficient work as when employed by private individuals or contractors. This is largely due to the fact that municipal construction of public works has never been, except in rare instances, undertaken upon a permanent basis, with the fact duly impressed upon the minds of the employees that the security of their position depended solely upon the efficiency with which their work was accomplished. Employees have usually secured and held their positions through political rather than business reasons. But if it were generally known and understood that the municipality was prepared to do good work, that a position once obtained on the force would be secure so long and no longer than the duties of the position were efficiently discharged, there can be no doubt but that competent men would soon seek the positions, and that even a greater stimulus would be added to the work of the employee of the public, than is given to the employee of the private contractor. It will, of course, require time to bring about these changes, and overcome the general disposition to regard a "public employment as a private snap;" but there is no legal or economic reason why this cannot be done, and why the work done by the public cannot soon be made the best that can be done, and an employment by the public the most honorable and secure that can be obtained. In fact, the works of public improvement now being done by the federal government, in the construction of public buildings, river and harbor improvements, and mail service, is rapidly converting the public mind to the idea that a government position is the most honorable, responsible and secure that can be obtained.

It is true, fraud will creep in; dishonest officials will obtain positions and the public service will sometimes be neglected; but, can it be claimed that the business of the private contractor is free from these troubles, that all of his employees are absolutely honest and upright and work their full time for the benefit of their employer? These are troubles incident to the frailties of human nature; and the fact that when a public official or employee goes wrong his name is paraded by the public press from one end of the country to the other, and his punishment made even more certain than the defaulter in private business will, in my judgment, very soon overcome the predisposition of public employees—except in rare instances—to look upon their employment as a passport to a life of ease, and a privilege to fatten at the public expense.

Honest officials, just as soon as they begin to feel secure in their positions, will themselves be the protectors and guardians of the public work. This is now true of all such public positions as are purely business in their nature, and are free from the contaminating touch of political influences.

The, to my mind, insuperable objection against the contract system lies in the fact that, in most states, the law expressly requires that all contracts shall be let to the lowest responsible bidder, and then the law proceeds to define "the lowest responsible bidder" as any one who can give bond for the faithful performance of his contract.

That bonds, however carefully drawn, are wholly inadequate to secure the prompt, faithful and satisfactory compliance with contracts, is a proposition too well understood and appreciated by all men who have ever had any experience in the enforcement of contracts to require any elucidation at my hands.

Even in states, or in the charters or cities where this is not the express law, there exists a public sentiment almost as inexorable in

its demands as a specific statute, that contracts shall be let "to the lowest bidder" and the public official who dares to apply the same business rules in the letting of contracts for public business that he would unhesitatingly apply in his own private matters, knows when he does so that he takes his political life in his hands and subjects himself to the slanders and vituperation of every ward politician whom he may have in any way offended, and every sensational newspaper scribbler. For some unaccountable reason, immediately upon his induction into office, the people seem to lose all confidence in a public official, become suspicions of his every act, and upon the slightest provocation, without investigation, are willing to join in the hue and cry of fraud and corruption in office, no matter by whom started. It is this lack of confidence, on the part of the public, that forces many good officials to do that which their better judgment does not approve; and especially is this true in the matter of letting contracts for public work.

There are, in the very nature of things, but three classes of contractors who can bid upon the public works.

The first, and unfortunately the most limited class, is the "honest contractor" who bids upon public work just as he does upon work to be let by the private individual, trusting upon his well-known and well-earned reputation for honesty, integrity and promptness, to enable him to secure a reasonable amount of work at a fairly remunerative profit, after allowing for the unusual and unknown contingencies which must necessarily enter into every class of contract work, no matter how thoroughly the contracts may have been studied and estimates made.

The second class may be designated as the "adventurer" or irresponsible bidder, who bids largely at haphazard, but always low enough to secure the business, trusting to good fortune and the inattention of city officials to let him get through with the contract in come form, and if loss must come, fully conscious of the fact that someone other than himself—either the public or his bondsman—will be the sufferer.

And the third class is known as the "boodler," who secures his contracts through "political pull" and inside information as to how the specifications will be construed, and inspections made when the contract comes to be executed, and whose bid is always low enough to take the contract from the "honest contractor," and at the same time provide for city officials and their clerks through whom valuable information is supposed to leak.

With only these three classes of bidders, how is it possible for the city to obtain value received for the work let under the contract system where the contract must be awarded to "the lowest responsible bidder?"

And how many public officials can you find who are willing to bear the storm of newspaper criticism, and trumped up public indignation in order to follow his own judgment and award the contract to a higher bidder, even if he has the legal right to do so?

The result is that the public work under "the lowest bidder" rule must be let either to the "adventurer" or the "crook," while "the taxpayer pays the freight."

To such an extent has this gone, and so well understood is it that the honest contractor has little or no chance when it comes to bidding upon public work, that a man or firm which is known to be engaged in the business of securing public contracts soon comes to be looked upon as little short of a criminal, and his methods of doing business regarded with suspicion by all classes of business men.

The contract system has done more to corrupt public officials, and lower the standard of official integrity, than any other one cause, save the granting of franchises to quasi-public corporations, which leads all other inducements to official crookedness.

The whole theory of letting contracts to the lowest bidder is founded upon the assumption that the public official is either incompetent or corrupt, and the average official if not incompetent or corrupt, is often only too willing to shift the responsibility of properly informing himself as to what is really best for the city, and accepting that character of work which the "adventurer" or "the crook" may give under the lowest bid.

After the lowest bid has been accepted and the work done, the official who felt constrained under the law or the stress of public opinion, to do what his better judgment told him was not best for the city when he let the contract, now, when he comes to accept the work, may know to a moral certainty that the work has not been done according to contract, that the material used has not been the best or that the inspector of the work has been "induced" or "persuaded" that something else than that called for by the specifications was equally as good or even better; yet the difficulty of making the legal proof, the delays and annoyance incident to a long and tedious law suit against possibly insolvent bondsmen, with the sympathies of the court and jury all on the side of an innocent bondsman and a much-wronged contractor(?), with no one but the general public to suffer, are sufficient to deter any official from the commencement of such a litigation unless the facts of the case are so glaring as to make it an absolute necessity.

The only possible remedy for this condition of affairs under the contract system is to do away altogether with the rule requiring the acceptance of "the lowest bidder," and placing public officials upon their honor, and imposing upon them the responsibility of doing what is best for the city, and then holding them to a strict accountability for the results accomplished.

If this be too radical and dangerous a step to take, the only other possible escape from the dangers and absurdities of the contract system is to require the municipality itself to do all work of a public character and have a responsible head or superintendent for each department of public work whose position is given to him during good behavior, or so long as the results of his management show him to be entitled to public confidence.

Such a system will, of course, require time to build up and have it established upon a sound basis with the proper machinery and appliances for doing all classes of work to the best advantage; but if governments are organized for the purpose of serving the public good and doing the greatest service to the greatest number, the growth of this system, if it is made to keep pace with the natural growth of the city, will, in the end, work out to the advantage of all.

Of course, mistakes will be made. No government ever has been, or ever will be, found perfect or free from defects; but if the responsibility is placed upon public officials, and they are made to understand that their administration of public affairs will be judged by the results actually accomplished, the chances are that the best possible results will be accomplished, and the most efficient administration possible of public affairs obtained.

Such a system will educate the masses of the people in governmental affairs, will make them take and feel an interest in the administration of their local governments, and in the end do more to prevent corruption in office and elevate the tone of official life than anything that can be done.

I respectfully submit, and most earnestly insist that the municipal construction of all work of purely a public character, that are in and of themselves necessary monopolies, is not "socialism," nor is it "municipal trading" as those terms are used and understood in modern sociological discussions. This country is not yet ready for the advent of socialism, nor is municipal trading yet necessary for the protection of the poorer classes. I sincerely trust that such expedients may never become necessary in "this land of the free and home of the brave." And if the masses of the people but remain true to themselves and the institutions under which they live these conditions never can arise.

It must not be forgotten, however, that municipal governments are largely business organizations in which the people are stockholders and city officials, directors, chosen for the time being to look after and manage their affairs for the best interest of all; that the only real necessity for the organization of a municipal government at all, is to enable the people as a whole and in their aggregate capacity to do that which as individuals they could not accomplish, and which is necessary and best for the public welfare. And whenever a municipal government ceases or fails to perform these functions the real reason for its existence is gone, it soon becomes an engine of oppression, and a mere machine for the distribution of public plunder.

(To be concluded in the December number.)

WATER WASTE

Cleveland's Experience with Water Meters—Are Checking Waste—To Reduce Per Capita Daily Consumption to 100 Gallons—Why Meter System Is Popular

By Edward W. Bemis *

IT is here proposed merely to give the experience in the direction of the methods of checking water waste in the city of Cleveland, Ohio. This experience is significant, because: 1. Water meters are being set in Cleveland far more rapidly than has ever been attempted in any city of the world. 2. This is being done under municipal ownership. 3. It is compulsory upon everyone to have a meter, as soon as the Department can set them, but the expense is borne by the Department. 4. Not only has the setting of meters thus far accomplished the results expected, but it has been done in a way to accomplish what the majority of waterworks and city engineers have hitherto supposed impossible, viz., it has become exceedingly popular with the majority of the water takers.

During the twenty-six years prior to 1902, meters had been introduced upon nearly all the business premises of Cleveland save some small stores and saloons, but scarcely anywhere else. By the close of 1901, there were in use 3,540 meters and elevator indicators, or a little over 6 per cent. as many as the services, numbering 55,130 that were then in use. Less than 500 residences were metered, most of them at the expense of the consumer. Only 121 meters were five-eighth inch.

ALARMING INCREASE IN CONSUMPTION OF WATER

The consumption of water, however, had increased much faster than the population until it had reached alarming proportions. During ten years from 1891 to 1901, while the population had increased 46 per cent., the pumpage had increased from 10,142,000,000 gallons to 25,422,000,000 gallons, or 150 per cent., and per inhabitant from 111 gallons per day to 169 gallons. During six days from October 17th to October 22nd inclusive, in 1901, the consumption of water during the hours of least consumption in the middle of the night was 60 per cent. as much per hour as the average of the whole twenty-four hours, and 30 per cent. as much as the maximum use. This was not a period of extraordinary consumption. Even worse conditions were found to prevail during periods of larger consumption in the middle of the winter. The evidence at hand does not show that any large percentage of this waste is due to leaks in the mains or in the service pipe between the main and the curb. The waste was believed to be inside the premises of the consumer and was increasing so rapidly as to force the department, despite a large yearly surplus, to resort to frequent large bond issues to supply new pumping machinery and buildings therefor and large feeder mains. It was believed, and experience has justified this, that metering would save in expense of extensions along these lines and in tunnels under the lake much more than the cost of the meters; while the saving in coal and other pumping expenses would go far to meet the increased expenses in other directions, such as meter reading, meter repairs and the collection department, naturally resulting from the installation of meters for domestic consumers.

On the 1st of October the city had metered about 21,000 out of about 58,000 connections in use. It is planned to advertise in February for 15,000 more meters to be set during, 1904.

METHOD AND COST OF SETTING METERS

At first, nearly all the small meters were set in basements; the others were set, as nearly all meters had been previously in Cleveland, in brick vaults at the curb. It was soon discovered that many houses had no basements or none convenient for meter setting. In other cases there were fears that the meters would be tampered with in the basements and sometimes there were difficulties in reaching those meters in order to read them, and hence a cheap but durable method of setting at the curb was sought for. This was at last found in an adaptation and improvement made by the Meter Department upon a method of sewer pipe setting in use in Watertown, Mass. This method of setting, described in the last annual report of the department, consists in bringing up the service pipe to two feet from the surface and enclosing the meter and the pipe below the base of the meter with two lengths of two-foot long sewer pipe fifteen inches in diameter in the inside. The service pipe is six feet beneath the surface but the meter is brought up as above stated, so that the top of it is only eighteen inches below the surface and can be read from the top without an extension dial and can be easily taken out by kneeling upon the ground. The space from the base of the meter to the surface of the ground is not filled in with any substance except air, but there are two covers, an iron one on top and a wooden one with a felt bottom resting loosely on the top of the meter. These two air chambers are found to be sufficient to prevent freezing. Not a single meter froze of the 974 that were in use last winter in this style of setting. The cost of materials for sewer pipe setting was during 1902 $4.38. The meters can be read more easily, of course, and are more thoroughly under the control of the department than those set in basements.

The average cost of the five-eighth-inch meters set during the first nine months of 1903 has been $6.50, and of meter and setting $13.34. During June, July and August, when only 626 meters out of 4,999, or about one-eighth were set in basements, the average cost was about $7.50 for the setting, or $14 including the meter, and this may be taken as the maximum beyond which the cost is not likely to go,—unless, indeed, a trust of meter manufacturers is organized, and we believe that they must recognize the injury they would do to themselves by such a course through the great check it would entail upon the now rapidly growing popularity of the meter system. The cost of repairs and renewals will probably not exceed 50 cents a year for each five-eighth-inch meter.

RESULTS OF INTRODUCTION OF METERS

In 1894, the Department pumped 32.5 per cent. more water than in 1891; in 1897 the pumpage was likewise 22.3 per cent. more than in 1894; while in 1900 it was 38.7 per cent. more than in 1897, but during the first nine months of 1903 it was 7.1 per cent. less than in 1900, and will probably be that much less for the whole year. The difference between an increase of 38.7 per cent. and a decrease of 7 per cent. is over 45 per cent., yet there was no considerable introduction of meters until the summer of 1902. A small proportion of this reduction is due to the fact that through the installation of two new pumps at the close of 1902, the average slip of the pumps as determined by the pitometer is now about 6 per cent. instead of about 10 per cent. prior to 1903. Nearly all the reduction in pumpage is thus seen to be due to meters, for the growth of the city in population and business prosperity, which has been most marked since 1896, has continued to the present. The pumpage in 1902 was less than half of 1 per cent. greater than in 1901, and thus far this year it is 12.1 per cent. less than during the corresponding period of last year, despite the rapid growth of the city. The daily consumption per capita will be under 145 in 1903 as compared with 169 in 1901. We expect, however, to reduce the pumpage ultimately to 100 gallons per capita. In the mean time the receipts for water during the first nine months of 1903 have been $510,260.27, or $92,687.86, i. e., 22.2 per cent., more than the $417,572.41 during the corresponding period of 1900. The increase during the first nine months of 1903 above the corresponding period of 1902 has been $33,789.24, or 7.1 per cent.

WHY THE METER SYSTEM IS POPULAR

Attention must be called to what is believed to have been the most interesting lesson of Cleveland's experience, namely—that the metering has been carried on in such a way as to be popular. The secret of this state of affairs lies in the following facts:

1. The meters were set at the expense of the Water Department

* Superintendent of Water Works, Cleveland, O. This is a digest of a paper read by Mr. Bemis before the seventh annual meeting of the League of American Municipalities, held at Baltimore, Md., October 7-9, 1903.—[EDITOR.

and paid for out of its net earnings without the issuance of bonds therefor.

2. No attempt was made at the start to select the districts where the most waste might be expected to exist, as for instance in the older sections of the city where the plumbing is the poorest, the department deliberately selecting several different sections of the city fairly typical of all classes of consumers. The object of the department was to convince the mass of the voters that the meter in the hands of the ordinary prudent householder is sure to prove a financial gain, while not really limiting a legitimate use of water.

3. In further pursuance of the policy just outlined people are not charged for any waste of water that is discovered by the meter until the beginning of the six months period subsequent thereto, namely, April 1st and October 1st. The meters are read about once in every six weeks and the consumers and owners are notified by a polite letter and personally wherever possible, if there is evidence of large waste.

4. Another secret of success has been the maintenance of such a ratio between assessment or flat rates and meter rates as to render it practicable for most people to reduce their bills by having a meter. The meter rates were already only 5 1/3 cents per 1,000 gallons or 40 cents per 1,000 feet, which is lower for small consumers, so far as we have been able to discover, than in any other city in the United States. The policy in Cleveland fortunately is popular of charging the same rates for large and small consumers of water.

An idea of the assessment rates may be obtained by the statement that it is $3 per year for dwellings of one, two or three rooms; 50 cents for each additional room; $2 for each bath room; $2 for each water closet and nothing for laundry or kitchen or other faucets, while sprinkling of lawns sixty-six feet or less in width is free. Thus an ordinary six-room house with one closet and one bath tub would be charged on the assessment rate $8.50 per year and on the meter basis the minimum would be $6. There is little complaint of our water rates, when we give six barrels of water for 1 cent.

5. A somewhat peculiar system of minimum rates adopted in connection with the general metering of domestic consumers has also contributed to the success of the system. Those whose assessment rate is $4 or less per year must in any event with a meter have a minimum of $2.50. Those whose assessment rate is $7 or less must pay $4. If the assessment is $10 or less the minimum is $6. All others having a ⅝-inch meter must pay $8 a year and those having larger meters $10 a year. These minimums are collected in two semi-annual payments which must be paid in advance.

Objection to Meters Overcome

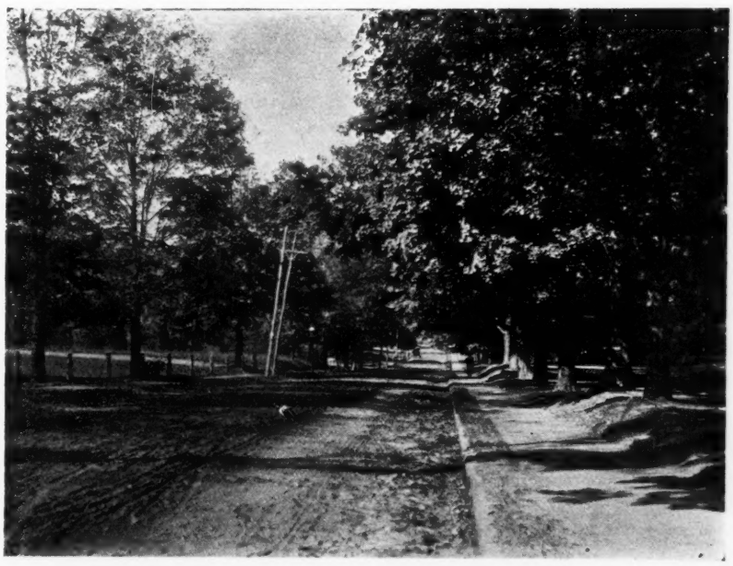
One objection to meters that was overcome by the minimum rate was that of some physicians who thought that the people would use too little water for health and decency if they only paid for what they actually used. The $2.50 minimum, however, for the smallest consumers allows the use of four barrels a day, while the $4 and $6 minimums, which cover the majority of homes, allow seven to ten barrels of water respectively per day.

The European method of house to house inspecting would be far more unpopular in America and less effective than the meter, which makes it to the self-interest of the consumer to avoid useless waste. What the Water Department gains from this stoppage of waste is no loss to the consumer save as it may entail upon him some slight addition to his present annual plumbing bills.

Four obstacles that have faced the water department of Cleveland remain to be considered. 1. The opposition of the master plumbers and to some extent of the journeymen plumbers also, to the setting of the meters directly by the city, and with the use of laborers at 21 cents, setters at 27½ cents and foremen and inspectors at 42 cents an hour instead of plumbers at higher rates. This difficulty has been met by employing a plumber to wipe all lead joints and by the fact that the new meters have largely increased the business of the plumbers in the repair of house fixtures.

2. Some physicians feared that the meters would obstruct the flow of water sufficiently to cause the accumulation of disease breeding filth at that point. This has been met by quoting the health records of metered and unmetered cities and of metered and unmetered consumers in Cleveland and by showing that the reservoir of the meter does not hold a half teacupful of water and is constantly cleaned by the rapid flow of water whenever a faucet is used.

3 and 4. The other difficulties we have encountered has been the waste of water in the public school buildings and numerous charities which by state law have hitherto secured their water free and so have been unmetered. We now plan to meter these schools and to see if we cannot legally prevent, by charge or otherwise, any use of water beyond such a daily amount per capita as the experience of cities that meter and charge for such use has shown to be reasonable.



Courtesy of Dr. E. H. Jenkins, Dir. Conn. Agricultural Station

STREET TREES PLANTED NEXT TO PROPERTY LINE, SHOWING ADVANTAGES OF BETTER SOIL CONDITIONS BY LUXURIANCE OF GROWTH

A MUNICIPAL ASPHALT PLANT

First City Plant on Continent—Successfully Operated—How the City Beat the Trust—The Story Told by Winnipeg's Mayor

*By John Arbuthnot**

The representatives of the various municipalities here assembled, will be interested in a description of the Winnipeg Municipal Asphalt Plant, the report of its operation and the method of laying the asphalt.

This plant was the first municipal asphalt plant on the continent, and it has been successfully operated since its installation.

Laying of First Asphalt Pavement in Winnipeg

The first asphalt was laid in Winnipeg in 1897—7,134 square yards, by local contractors, at $2.35 per square yard. Competition for this work was extremely keen, the old established companies urging that asphalt pavement could only be done by those long experienced in the business, the local men answering that they could purchase the same asphalt and employ the men who had been accustomed to laying it for the old companies.

Over 21,000 square yards of asphalt were called for during 1898-9, and the struggle which had taken place two years before was now renewed with increased bitterness, the local contractors contending that only experienced persons, such as themselves, could properly do this work, adding that the city would not be able to buy any good asphalt, as they were the only parties to whom the asphalt refineries would sell. But the city, bearing in mind how it had helped the contractors when in a similar position, did not feel much anxiety on this point, and the day labor advocates finally won out.

Bids for the necessary machinery for an asphalt plant were called for. After careful consideration it was decided to purchase the plant of the local company, although the price was something more than its value at the time. A lease of ground adjacent to the railway was secured and the plant erected at that point, where it has since remained.

When the city came to execute the paving, it was found that the threat as to preventing its procuring asphalt had not been idle, it being impossible to obtain prices on any of the standard Eastern asphalts. After careful investigation a contract was made for a supply of Ventura asphalt, and with such expert assistance as could be obtained, this asphalt was laid on Portage avenue.

Some Mistakes Made

At first, the mistake was made of trying to make a good surface with from 7 per cent. to 8 per cent. of bitumen. It was seen that this was not satisfactory and the work was taken up and relaid, the bitumen being increased to from 10 per cent. to 11 per cent. This asphalt has been down now for over five years and is in almost perfect condition, the only repairs that have been made are over new laid water pipe, and cuttings for other underground work, and in relaying the tracks of the electric street railway.

The quantities of asphalt laid in Winnipeg are as follows:

	Square Yards.	
1897	7,314	By contract.
1898	4,009	" "
1899	45,843	" day labor.
1900	22,195	" " "
1901	51,624	" " "
1902	82,404	" " "
1903	70,000	" " "
Total	283,389	

The kinds of cement used have been: Ventura, Alcatraz (small quantity), Obispo, Acme, Los Angeles, Trinidad Lake, Trinidad "land," Venezuela and Bermudez.

The least successful has been the Trinidad "land," although this was laid under the direction of the parties from whom the asphalt was purchased. Some of this asphalt was laid successfully by mixing it with California asphalt.

The repairs to asphalt pavements have, apart from settlement over pipe trenches and street railway work, been trifling. The amount for each year is as follows:

1899, nil; 1900, nil; 1901, $241.31; 1902, $47.89; 1903, $64.00.

The cost of the asphalt works is shown by the following statement:

Capital Account, 1901

To balance	$13,575.00	
New oil tank, smoke stacks, &c.	445.00	
Tools, ½ of cost	315.00	
Extension and repairs to plant, ½ of cost	925.00	
	$15,260.00	
Less depreciation at 5 per cent.	763.00	
		$14,497.00

Maintenance, Operation and Capital Charges, 1901

Maintenance and repairs to plant	$925.00
Tools ½ of cost	314.00
Interest at 4 per cent. on $15,260.00	610.00
Depreciation at 5 per cent. on $15,260.	763.00
Lost taxes	100.00
	$2,712.00

Total square yards asphalt laid by the city to date (March, 1902), including repairs, 122,443. Average cost per yard, 5.48 cents.

Capital Account, 1902

To balance	$14,497.00	
New grinder, elevator, &c.	955.66	
Tools, ½ of cost	333.87	
Extension and repairs to plant ½ of cost	2,528.38	
	$18,314.00	
Less depreciation at 5 per cent.	915.70	
		$17,398.30

Maintenance, Operation and Capital Charges, 1902

Maintenance and repairs to plant	$2,528.38
Tools, ½ of cost	333.88
Interest at 4 per cent., on $18,314.00	732.56
Depreciation at 5 per cent	915.70
Lost taxes	100.00
	$4,610.52

Square yards of asphalt laid in 1902 (including repairs), 90,815.6. Average cost per yard, 5.07 cents.

Summary

1899	Maintenance, operation and capital charges	$2,027.00
1900	" " "	1,970.00
1901	" " "	2,712.00
1902	" " "	4,610.58
Total for four years		$11,319.58

The plant consists of the following: boiler, 60-H. P.; engine, 40-H. P.; sand drum in brick setting; 2 melting tanks in masonry; 1 storage tank in masonry; 9-cubic-feet steam jacketed mixer; 1 set Sturtevant emery stone grinders, which, with shafting, belting, etc., are enclosed in a frame building.

* Mayor of Winnipeg, who prepared this article for the seventh annual meeting of the League of American Municipalities, held at Baltimore, Md., October 7-9, 1903.—[Editor.

Cost of Labor and Operation

The men employed at, and the cost of operating the plant are:

1 Superintendent, who has charge of the mixtures, testing and laying	$8.00	per day.
1 Gang foreman	3.00	" "
1 Miller	2.50	" "
1 Timekeeper	2.00	" "
1 Engineer	3.50	" "
1 Fireman	2.50	" "
1 Mixer	3.00	" "
1 Dustman	2.00	" "
I Tankman	2.00	" "
1 Feeder	2.00	" "
2 Boys	2.00	" "
Fuel, 7 cords wood at $4.67 (includes keeping fire at night)	32.69	
Oil waste and small stores	1.86	
	$59.05	

Average Cost of Operation per Day

The average force employed in laying the pavement is as follows:

5 Teams	at	$4.50	$22.50
1 Raker and fireman	"	2.75	2.75
2 Rakers	"	2.50	5.00
2 Tempers	"	2.50	5.00
2 Smoothers	"	2.00	4.00
4 Shovellers	"	1.80	7.20
2 Rollermen	"	1.80	3.60
1 Cement sweeper	"	1.80	1.80
1 Boy	"	1.25	1.25
1 Laborer	"	1.80	1.80
1 Watchman (night)	"	2.00	2.00
1 Steam roller man	"	3.00	3.00
Total			$59.90

Cost of Materials

The prices of materials in Winnipeg are:

Sand, per cubic yard	$1.25
Broken stone	1.10
Cut stone curb, per linear foot	.90
Artificial stone curb and gutter (lin. ft.)	.65
Cement, per 100 lbs., 1903	.85
Wood, per cord	5.00
Coal, per ton, bituminous	6.00 to $8.00

How the Pavement Is Laid

After the street is graded, stone cross drains put in, and the curb constructed, the foundation (earth) is covered by 3 inches of sand and gravel. On the sand and gravel is laid concrete, generally 4½ inches in thickness, but on important streets 5½ inches.

The concrete is composed of—1 part Portland cement; 3 parts sand; 5 to 6 parts broken stone.

For the last three years, the concrete has been mixed and laid by a machine, which consists of a hopper delivering to a belt carrier, which delivers the concrete materials dry into a mixer, where water is added and the whole thoroughly mixed. The mixer delivers the concrete into a second belt conveyor about twenty-four feet in length. This conveyor has both vertical and horizontal motions from pivots at the end of the mixer. The concrete is distributed by it for a width of about thirty feet.

The machine is driven by a 16 H. P. gasoline engine.

The materials are delivered by wheel-barrows into the hopper, and are not again moved by hand until they are levelled off in the street after having been delivered by the machine.

The concrete is delivered in piles extending from side to side of the street and from two to three feet apart. The machine being moved back by an anchored line, one end of which is wound on a capstan head attached to the fly wheel of the engine. Moving does not interrupt the delivery of materials nor the mixing process.

Cost of Labor in Operating the Mixer

The average gang employed on the mixer is as follows:

1 Foreman	$3.25	per day.
1 Engineer	2.50	" "
1 Water man	3.60	" "
1 Front conveyor man	3.60	" "
2 Tampers	3.60	" "
2 Shovellers	3.60	" "
2 Graders	3.60	" "
1 Cement man	2.00	" "
2 Track men and laborers	3.60	" "
Laborers to deliver material as required, generally 15	27.00	" "
Gasoline, 27 gallons at 25c.	6.75	" "
Oil waste, water, etc.	5.00	" "
Total	$68.10	

A working day is nine hours.

The average quantity laid is about 900 square yards of 4½ inch concrete.

Nothing is included in the above estimate for use of machine, as tools and plant are charged to the work in one item when it is completed.

When the concrete has sufficiently set, a binder course of 1½ inches in thickness is laid.

The binder consists of broken stone about ¾-inch and less in size. The stone is heated and thoroughly coated with asphaltic cement, at a temperature of 250 degrees Fahrenheit.

On the binder the surface coat of from 1¾ to 2 inches in thickness is laid.

The approximate composition and cost of the binder and surface mixture is as follows:

Binder

Limestone, 900 lbs.	$ .40
Asphaltic cement, 35 lbs. at 1½c.	.525
Fuel	.15
Labor	.22
	$1.295

At 7 square yards per batch, cost per square yard, $0.185 (capital and plant charges, etc., not included).

Bermudez

Bermudez asphalt at $30.00 per ton.

900 lbs. sand	$ .54
140 lbs. dust	.18
Fuel	.12
Labor	.32
Oil, 23 lbs. at 1½c.	.34
Asphaltic cement, 117 lbs., 100½ lbs. asphalt (gross wt.) at 1.5c.	1.50
	$3.00

At 175 pounds per square yard = 6.6 square yards.
Cost per square yard, $.455.

California

California asphalt at $25.00 per ton.

900 lbs. sand	.54
85 lbs. dust	.11
Fuel	.12
Labor	.32
120 lbs. asphaltic cement; 39 lbs. liq. asph., 1½c., $0.585; 90 lbs. Los. Ang., 1¼c., $1.125; 3 lbs. oil, 1½c., $0.045	1.755
	$2.84

At 175 pounds per square yard = 6.6 square yards.
Cost, per square yard, $.43.

The plant is supplied with sufficient laboratory apparatus to analyse asphalts, cement and mixtures; to determine sand grades and penetrations of asphalts.

A daily record is kept of the kind and quality of asphalt used, sand grades, penetration, costs, etc.

The quantities of work done each day, including repairs and cutting, is recorded by the Engineer's Department in plans of streets.

A DISCUSSION OF THE NEW PAVEMENT

Bitulithic Pavement and the Methods of Its Construction Described Before the Tenth Annual Meeting of the American Society of Municipal Improvements

By C. A. Kenyon

WHEN this pavement was first invented, it was called Warren's bituminous macadam pavement. The name was deceptive. It led many well meaning people to believe that it was made by mixing bitumen with macadam stone, and laying it as any macadam is laid. Opponents of the pavement immediately declared, among other things, that there was nothing new about it, and that the claim of Mr. Warren that he had invented a new pavement called "bituminous macadam" was mere pretense, that the mixing of bitumen and broken stone was so simple that it required no inventive talent to do it, and that it was absurd to claim that such a mixture was patentable. The name, together with these plausable but malicious statements, had a tendency to deceive those who did not look carefully into the pavement and its construction. A name was therefore selected that was entirely new, one that could not be used to deceive people by the enemies of the pavement, and it was called "Warren's Bitulithic Pavement."

It is true that it is made of broken stone and bitumen, but for all that, it is no more like the ordinary macadam roadway than the best Haviland china is like an ordinary building tile because they are both made out of clay.

It did not take engineers, public officials and property owners long to see the difference and to see the advance which had been made in pavement construction, as is evidenced by the following statement of the amount of bitulithic pavement laid in the United States in the short time since its discovery, and I predict that the demand for the pavement in 1904 will be double that of 1903.

There was laid in 1901, in 6 cities.....	14,400 sq. yds.
There was laid in 1902, in 35 cities.....	440,831 sq. yds.
There was contracted for, in 1903, to July 15th.....	858,999 sq. yds.
Total in less than three years.....	1,314,230 sq. yds.

You will agree with me, I think, that this is an unprecedented record, especially when considering the opposition from opposing paving interests that had become entrenched, and from conservative doubters that always exist. In discussing methods of construction, I will commence with

THE FOUNDATION

The sub-foundation should be prepared the same as for any other pavement, soft and spongy places in the grade should be removed and filled with proper material, and the grade should be thoroughly rolled, unless the foundation is so sandy that it will not pack, in which event rolling is an injury rather than a benefit. I believe that the best method of treating such a foundation, is to bring it to grade (full) and flush it with water, and over this, spread a thin layer of marsh, or other tough hay or straw, one inch thick, evenly distributed. Upon this spread the crushed macadam stone, broken so that the sizes are from one to three inches in diameter, the dust and screenings should be removed. If it will not increase the cost too much, place the coarsest stone at the bottom and roll and then top dress and bring to true grade with the one-inch stone.

Over this, sprinkle lightly, the "number one composition," which is very fluid, and is for the purpose of aiding the strong, stiff "number twenty-four composition" to adhere to the cold stone, and, as it is reheated by the application and rolling of the wearing surface, to penetrate between the stones of the base and bind them together and make them foundation waterproof.

The "number twenty-four composition" should be heated to a temperature of from 200 to 260 deg. F., and care should be taken not to burn it, and equal care should be taken to have it evenly distributed over the surface. Pools, or excessive amounts are not desirable, although I have as yet discovered no ill effects from this cause in the few instances I have noted.

Some advocate rolling this foundation, while others hold to the contrary view. If the foundation has been thoroughly rolled, I see little use or harm in it. The contractor sometimes wants to roll it, as less of the surface mixture will be required, especially if the foundation is rough and the stone coarse.

Some engineers have felt that the pavement would be better with an hydraulic concrete foundation, and opponents of the pavement have sought to decry it, because such a foundation was not provided, but, I believe that in nearly every instance, such opinions were arrived at by academic reasoning, and have not the facts of experience back of them.

I believe that, with a reasonably solid sub-foundation, properly prepared, the bituminous foundation will be found to be superior to the concrete foundation for the following reasons:

(a) The broken stone is wedged together by the great pressure of the heavy rollers, and the under surface fitted under pressure into all of the inequalities of the sub-grade if it will carry a fifteen-ton road roller. Such a foundation will carry any load that will be hauled over it.

The hydraulic foundations are merely dumped onto the grade and lightly tamped, and such a foundation has not an even bearing, and is not fitted to the inequalities of the subgrade. Few such foundations would withstand a fifteen-ton road roller passing over them, without damage.

(b) The bituminous is more elastic than the concrete foundation; hence is better for the wearing surface as being homogeneous with it, and firmly uniting with it.

(c) If the sub-foundation under a hydraulic concrete pavement base is wet, the concrete draws itself full of water, by capillary attraction. In winter the water in the concrete freezes and expands and contracts to the injury of the foundation and wearing surface over it, especially is this true, when the wearing surface is asphalt or wood blocks. This has been demonstrated beyond question. Such a thing cannot happen with the bituminous foundation, for the reason first, that the spaces between the stones of the foundation are too large to permit of capillary attraction, and, second, the bituminous coasting is entirely impervious to, and not affected by, water.

If the water had such a head, as to rise between the stones (which would be a very unusual thing) and freeze, I do not believe it could do any harm. It could not break any part of the pavement by expansion or contraction because of the elasticity of the foundation, as well as the top.

(d) Bituminous foundations have proven their value by experience, for many have been in use in Washington, D. C., and other cities of this country for over thirty years, and are giving perfect service at this time. I have examined many of them myself, and have talked with engineers and constructors who are familiar with them, as well as having consulted engineering books, and I have not known or heard, or read of any well authenticated, specific instance where a well laid bituminous foundation for a street pavement has been other than successful.

HOW TO LAY THE WEARING SURFACE

We now come to the selection of materials, the preparation and laying of the wearing surface of the bitulithic pavement.

To get the perfect wearing surface, the genius of the inventor, the art and thoroughness of the constructor, the intelligent watchfulness of the engineer, are all taxed to their utmost.

* Indianapolis, Ind. This paper was read before the tenth annual meeting of the American Society of Municipal Improvements, held at Indianapolis, Ind., Oct. 20-22, 1903.—[EDITOR.

Let me halt a little in this descriptive discussion, and recall to your minds the almost conflicting combination of qualities, that the best authorities tell us should be united in the perfect pavement surface.

Mr. George W. Tillson, in his well-known work on paving, names them, and gives each quality its percentage value, as follows: Cheapness, 14 per cent.; durability, 21 per cent.; ease of cleaning, 15 per cent.; light resistance to traffic, 15 per cent.; non-slipperiness, 7 per cent.; ease of maintenance, 10 per cent.; favorableness to travel, 5 per cent.; sanitariness, 13 per cent; total, 100 per cent.

The nearest that any pavement he names comes to these conditions, is asphalt, at 76 per cent., and brick, at 67 per cent. A recent writer in a technical journal, on the same basis, gives the bitulithic pavement 82 per cent.

Mr. Ira O. Baker, in his work on "Roads and Pavements," gives a table with some slight differences in the percentages of values of stones are properly distributed in and occupying the voids between the larger stones, and the still smaller stones performing a like function in the voids which they should occupy, and so on, down to the finest dust, thus making a mixture of the various pieces that in density was within 10 per cent. of the solid stone before it was broken into pieces; then covering completely each particle of such stone mixture, large and small, with a heated elastic waterproof bituminous cement, sufficient to fill the remaining voids and make the densest mixture practicable. Such a mixture, it was thought, could be laid in a sheet on the street, and produce a dense, smooth, durable surface, with a good foothold for horses, and one that could be easily and cheaply repaired and cleaned.

Such a result was worked out in the laboratory, with results beyond expectations, but when an effort was made to duplicate the result on a large and commercial scale, obstacles appeared and multi-

HIGH STREET, PORTLAND, ME., PAVED WITH BITULITHIC PAVEMENT

these qualities, and his judgment gives asphalt 77 per cent; brick, 70 per cent., and the writer in the technical journal referred to, gives bitulithic pavement, on the same basis, 88 per cent.

Many who have studied the construction, and watched the results of the bitulithic pavement, believe that its inventor discovered a construction that comes nearer meeting all these requirements, than any other form or method of construction in practice at this time.

The Theory

of the inventor, in short, was as follows: First, to get a material for the wearing surface that was universally available and durable, at moderate cost. Hard stone was selected (the harder the better). Stone had long been in use in block form, and as macadam. You know the objections to the material in both forms.

The theory worked out was to crush the stone into a variety of sizes, ranging from pieces one and one-half inches in diameter to an impalpable powder; to predetermine the quantity by weight of each size; that, when all are properly mixed together, the smaller

plied, and it was only by the most indomitable energy and perseverance, united with creative ability of a high order, that the theoretical was made practical. A false step anywhere along the line threatened ruin. One of the first, and almost the most important thing, was to secure a commercial supply of a suitable bituminous cement. Asphalt, coal tar and roofing pitches were on the market; the owner of each thought his material was the best for making the pavement; many thought any of them would do, but experience soon showed that there were no suitable cements on the market, that the known asphalt cements were not suitable, hence a cement had to be especially manufactured to obtain the proper results; new machinery, methods, and appliances had to be devised or invented.

Another difficulty arose in getting the stone crushed in the proper sizes, and disposing of the rejected sizes. The crusher would not turn out the correct proportion of each size. Few, if any of the crushing plants had the proper screen arrangement. This increased the cost above expectation. The crusher screened the stone cold, and it was often damp or wet, the fine would adhere to the

coarse pieces, and another trouble arose, the proportions would go wrong. Finally, it became necessary to devise and invent a screen and storage bin arrangement by which the stone could be separated into sizes, after being heated, and stone of the same size placed in one bin and those of different sizes in other bins, in such a way that the exact amount of each size of stone could be weighed separately, and all placed in the revolving twin-pug mixer at the same time while heated, after which, the heated bituminous cement had to be weighed on a separate scale and poured into a mixer. After which it it was dropped into a wagon and hauled to the street.

Difficulties in loading and unloading the wagons, in placing the same on the street, were almost as numerous. And after the machinery was invented, men had to be trained to operate it, and with each succeeding plant, a new force had to be trained.

Analogous difficulties arose over the application of the flush coat, the spreading of the screenings, etc., etc. New problems all along the line. One would think that the asphalt industry would have furnished plenty of experienced men, but it was soon found that the work was so different that workmen from that industry had to unlearn much before they could become efficient in this new work.

BITULITHIC PAVEMENT ON WEST PINE BOULEVARD, ST. LOUIS, MO.

THE CEMENT

The greatest difficulty was in securing a suitable cement, uniform in density and quality. It is now generally recognized as firmly established that the merchantable Trinidad asphaltic cements contain salts soluble in water, and therefore this material was not believed to be lasting or suitable. There were and are scattered over the country in many cities, small areas of street pavements, and sidewalks laid many years ago, the cementing materials of which was manufactured from coal tar. It was and is true that while these small areas have outlasted any mastic pavements made from other bitumens, that alongside of the them, other parts of the pavements or walks, supposed to have been made from the same material, disintegrated and went to pieces in a short time. None of the manufacturers of the cement knew why, or, if they did, made no effort to remedy the defect, and at the advent of the bitulithic pavement, there were no paving cements manufactured from coal tar on the market. There were some excellent roofing cements, but the paving cements had long since disappeared.

An exhaustive study of coal tar revealed the fact that these old paving cements made from coal tar lacked:

1. Uniformity in the quanty of the tar from which the cement was made. Tars from different coals were often placed in the same still.

2. Uniformity in density or viscosity. There was no method in use by which tars of different quality could be brought to a uniform degree of quality and density.

3. Approximate uniformity of chemical and physical properties. Coal tar is one of the most complex substances known to chemistry. No one knows what combination of chemical qualities would yield a product with the desired physical qualities or knows how to produce the cement uniformly from the crude materials, so that when the proper chemical combination (approximately) was discovered, there existed no machinery to manufacture it on a commercial scale, and suitable methods and machinery had to be devised to manufacture and test the product.

These difficulties have been overcome and an excellent cement,

uniform in quality, chemical and physical, and of a standard, uniform density, is being produced for the purpose of making this pavement. There may be here and there lapses, now and then an error or mistake is likely to be made, in fact, cannot help being made, but such care is being taken that the chances for mistakes are being reduced to a minimum.

The essential thing is that the defects in the selection of the tars and their manufacture have been discovered, and the means, method and appliances also discovered for remedying the defects. This constitutes a distinct, radical and valuable advance in the paving industry. I am aware the man who has something else to sell, or who is opposing this form of pavement or this industry, has said and will say again, that it is coal tar, and that coal tar is coal tar. Just as when steel was discovered, many still thought it was "just iron," but time will discover all of these things. The skeptic seldom sees the discovery; the one is at the front, the other in the rear of the procession.

It is reasonably certain that the "Puritan Brand" of cements, if the present standard is maintained—and there is every reason why it should be improved—will last as a cement until the stone which is cemented together by it, into a pavement, is worn out. The cement is not affected by water and therefore renders the pavement perfectly waterproof.

When the wearing surface of a street pavement is made of the materials and in the manner I have described, it has great density, and approaches very nearly to a solid. Graded stone has from 9 to 11 per cent. of voids. Graded sand has from 27 to 35 per cent. of voids. In the stone mixture, the inherent stability of the stone permits the use of a softer cement, one with more life—one less affected by cold—more elastic. The cement fills all the voids and is not subject to attack by air and water in minute particles, as it would be if a sand mixture instead of a stone mixture were used.

The stone mixture graded as described has about one-tenth the surface area of particles that graded sand of the same volume has. If the same amount of bituminous cement is mixed with an equal volume of graded stone as is mixed with the graded sand, the coating of the cement on the stone particles must approximate ten times the thickness it would on the graded sand, and therefore, if exposed, should endure ten times as long.

The stone offers a rougher surface to horses and is proving successful on 12 per cent. grades. The stone thus cemented together cannot be dislodged, as in macadam. It does not grind under traffic. It cannot be washed away or swept away. It can be easily and cheaply cleaned. It does not get dusty in dry weather.

While it is made of hard stone, which gives it greater wearing qualities, yet, inasmuch as each of these stone particles is encased in a soft cement, the pavement is very quiet.

As the public becomes acquainted with its qualities, it grows in popularity. It is reasonable in cost, and from a scientific standpoint has the endorsement and approval of leading municipal engineers, and officials from over the entire country. It will therefore appear that if the bitulithic pavement is not given over to its enemies, if the present standard of excellence in materials and construction is maintained, if slipshod methods, hybrid specifications and inappropriate materials are not permitted to creep in, and destroy it, before its excellence is universally conceded, that inside of five years it will be recognized as the standard pavement of this country.

THE LEAGUE MEETING AT BALTIMORE

MANY pages of this issue are devoted to the papers presented at the meeting of the League of American Municipalities held at Baltimore October 7th, 8th and 9th. Several others will be published in the December number. A complete report of the convention, including the addresses, papers, reports and discussions, will soon be published by Secretary John MacVicar, who may be addressed at Des Moines, Ia.

The officers elected for the ensuing year are as follows:

President, Mayor James M. Head, Nashville, Tenn.

First vice-president, Mayor Crolius, Joliet, Ill.

Second vice-president, Mayor William C. Maybury, Detroit, Mich.

Third vice-president, Mayor Ignatius A. Sullivan, Hartford, Conn.

Secretary, former Mayor John MacVicar, Des Moines, Ia.

Treasurer, Mayor William D. Morgan, Georgetown, S. C.

Trustees: Alderman James Kane, Wilmington, Del.; Mayor-elect R. G. Rhett, Charleston, S. C.; Councilman George S. Brown, Baltimore, Md.; Mayor G. M. Hine, Poughkeepsie, N. Y.; Mayor H. C. Borghoff, Ft. Wayne, Ind.; President Board of Public Service Henry Bohl, Columbus, O.

Mayor Robert M. McLane, of Baltimore, on behalf of the delegates, presented Mayor J. Adger Smyth, of Charleston, S. C., with a handsomely engraved gold badge.

JAMES M. HEAD
The New President of the League

The city of East St. Louis, Ill., was selected as the next place of meeting. Atlanta, Ga., made a strong fight to secure the next convention, and was beaten only because East St. Louis is across the river from St. Louis, where the big fair will be held next year, and where the delegates will have an opportunity to study American and foreign civic conditions in the "model city" exhibit.

The arrangements for the entertainment of the visiting delegates by the city of Baltimore were most comprehensive, including a visit to the new garbage reduction plant, an inspection of the park and water-works systems and two excursions, one to Annapolis, which took all the afternoon and evening of the last day, was enjoyed by about 200 of the delegates, and the other was a special trip to Newport News, arranged by the courtesy of Mayor McLane with the Merchants' and Miners' Transportation Company. About fifty of the delegates enjoyed this trip, leaving on Saturday, and returning on the following Monday.

The most important business transacted by the League at this session was the appointment of a committee for the purpose of revising the Constitution and By-Laws and carrying out the suggestions made by Mayor Head in his article published in the September number of the MUNICIPAL JOURNAL AND ENGINEER. These suggestions called for the creation of an associate membership, the broadening of the scope and work of the League, the appointment of permanent committees and the removal of the secretary's office, as soon as the condition of the League will warrant it, to New York City. President Head was made chairman of this committee, and it is expected that he will call a meeting of the committee to be held in the near future in New York City.

One of the changes in the constitution will provide for the admission of all manufacturers, contractors, supply men, consulting engineers and any others who may have business dealings with municipalities, as associate members, with all privileges except voting. In this way the hearty co-operation of the associates can be secured in arranging for an annual municipal exhibit, the usefulness of the League greatly increased and all American municipalities much benefited.

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A Resultful Mayor

THE man who brings things to pass is the man of mark in these strenuous days. When a man is asked by his fellow citizens to shoulder certain responsibilities, in order to achieve certain results, and gets what he was sent after, he is worthy of the highest commendation. Such a man is James M. Head, who laid down the responsibilities connected with the office of Mayor of Nashville, Tennessee, on the 13th of last month. The civic improvements in Nashville has been so notable that they demand special attention at our hands. The inauguration of Mr. Head, as mayor, for the first term, four years ago, was the beginning of a new era in the civic life of Nashville. From a city dominated by unprincipled corporations, poorly lighted, inadequately served by the street railway company and other public utility corporations, with unimproved streets, with practically no park system, with an imperfect sewer system, in four short years, it has been transformed, and the evils and imperfections mentioned have either been wholly eliminated, or the city placed in a position where, in due course of time, the solution of the problem will be worked out to the satisfaction of the citizens. The record of these four years is one to which the citizens of Nashville may point with pride; it is one which has been equalled by few other municipalities in the United States, and excelled by none.

The financial showing is excellent. While the bonded indebtedness has been increased during this period, by $150,000 for the construction of an electric light plant; $400,000 for the construction of new streets and sewers; $50,000 for a viaduct—the expense for which was authorized prior to the inauguration of Mr. Head, but actually issued during his administration—making a total increase of $600,000, during this same period, every dollar of the city's indebtedness has been paid as it matured, and $85,000 of bonds maturing in 1905 taken up and cancelled, making a total reduction of the indebtedness of $371,700. When Mr. Head came into office there was a floating indebtedness of $87,266.15; on his retirement, there was no floating indebtedness against the city, and it had a cash balance in the bank, to its credit of $256,489.11.

Four years ago, the city was practically "under the thumb" of the several public service corporations, and the public was obliged to pay an exorbitant price for gas and electric light, and to put up with an inferior street car service. As a result of the reforms instituted by Mr. Head, the city has the right to purchase the plant of the gas light company at any time after ten years, and the rate to be charged for gas, per thousand cubic feet, is not to exceed $1, and 5 per cent. of the gross income is to be paid to the city, in return for privileges granted, in addition to the regular taxes upon the company's property as determined by the market value of its stocks and bonds. Notwithstanding the fact that the company had been charging $1.50 per thousand cubic feet for gas prior to the beginning of Mayor Head's administration, the market value of its stocks increased from ninety-nine cents to $1.20, and the amount of gas consumed increased from 165,000,000 to 225,000,000 cubic feet per annum. The company now pays the city $12,000 per year as its 5 per cent. share of the gross income. Another satisfactory result is found in the elimination of the company's influence in local politics.

Through the influence of Mayor Head, the so-called "Baltimore Syndicate," which was formed, and began work just prior to his election as mayor, for the purpose of buying up and uniting the street car, electric light and gas companies, not only of Nashville, but of the entire State, was defeated in its purpose. Mr. Head was aggressive and open in his fight against this scheme, denouncing it as "unjust, illegal and vicious in principle." His attitude was sustained, not only in the city and by the courts, but in the State as well.

In the settlement of the street car controversy, which grew out of these various schemes, the city was benefited still further through the wisdom of the Mayor. The service of the street car company was improved to the extent of $1,800,000. It agreed to keep paved, between its tracks and for two feet on either side, the streets over which its lines extended. In addition, it was required to present to the city "Centennial Park," consisting of seventy-five acres, and, during the life of its franchise, to pay to the city, for park purposes, 2 per cent. of its gross annual income until its gross income reached $1,000,000 per annum, when 3 per cent. is to be paid. The street car company further assumed the costs in connection with the litigation incurred by the city over the question.

The showing for the electric lighting plant is equally satisfactory. Four years ago, the city was paying $85 per annum for 382 arc lights, and the citizens were paying 12 cents per kilowatt for electricity, either for power or illuminating purposes; to-day, the city owns its own plant, is better lighted and the expense for operating the plant for one year, including interest on bonds, repairs and other expenses, except depreciation, amounted to only $35,162.96. The actual cost of producing electricity has been 2.65 cents per kilowatt. The private company which formerly had the contract for lighting the city continues to do commercial lighting, and is now making contracts with private consumers for a term of years at 5 cents per kilowatt.

In blocking out the policy of his administration, Mayor Head wisely determined to make large expenditures for the improvement of streets and sewers, and it is well known that it is impossible for any city to thrive and prosper with poor streets and an inefficient sewer system. He therefore secured the authority for the issuance of $600,000 of bonds, to be issued at the rate of $200,000 per annum, to be expended for the improvement of the streets and sewers of the city. Four hundred thousand dollars' worth of bonds have been issued, according to the provisions of the ordinance, and 4.38 miles of trunk sewers and 5.4 miles of permanent streets have been constructed. As it is generally known that a large amount of the new pavement—bitulithic—has been laid in Nashville, our readers will be interested in what Mr. Head had to say in his ex-augural address, as follows:

"At a meeting of the American League of Municipalities, which met in Jamestown, N. Y., my attention was called to bitulithic pavement, composed of crushed stone, sand and bitumen in prearranged proportions, and so heated, mixed and rolled as to make a waterproof pavement with the crushed stone, held in place by the bitumen, as a wearing surface, which impressed me as having the lasting qualities of the stone, with the smoothness, but without the slipperiness of the asphalt, making, to my mind, an ideal form of pavement, if these results could be accomplished at a reasonable cost. The matter was taken up with the Board of Public Works and the City Engineer, and, after a thorough investigation by them, it was

decided to try 25,000 square yards of this pavement on Broad Street and the Public Square, and, if after trial it proved satisfactory, then to purchase a plant and continue the building of this street in our city.

"The experiment made was even more satisfactory than was anticipated, it not only being a better pavement, but the difference between the cost of the brick pavement, which we had contracted for, and the bitulithic pavement, was more than enough to pay for the plant purchased by the city.

"We now have a contract whereby we are having this pavement laid cheaper than any other city in the United States can obtain it, because the work is done under municipal construction, and both the profit and guarantee of the private contractor are saved.

"In authorizing the purchase of this plant, and securing the contract it did for the continued building of this pavement, I feel that the city authorities of Nashville are entitled to the lasting gratitude of the people of this city. It has gotten rid of the mud and dust of the limestone macadam; of the noise and expense of the granite block; of the noise, expense and slipperiness of the brick; of the expense and slipperiness of the asphalt, and of the expense, slipperiness and unhealthiness of the wood block; and has given to the people of Nashville a universally popular and satisfactory street at a reasonable cost.

"If nothing else had been accomplished during the past four years, I feel that the introduction of this pavement into our city, upon the terms secured, will be worth thousands of dollars annually to the people of this city."

Other improvements were effected in the fire and police departments, in the garbage and street cleaning departments, waterworks and public school system. These improvements, together with the increased assets of the city, secured under the initiative of Mayor Head from the public service corporations, are most gratifying, and cannot fail to mark for future generations this beginning of civic prosperity. The city of Nashville is to be heartily congratulated over the results achieved, and it is expected that the reforms so well begun will be continued through the new administration.

The Fenderless Car

We are in daily receipt of one or more newspaper clippings from all parts of the United States like the following:

"On Saturday, September 26, 1903, Annie Wright, seven years old, was run over and killed by a Columbus avenue car at the corner of Columbus avenue and West 100th street, New York City."

We have repeatedly called attention to the work of the fenderless trolley car. We have met with some success in persuading cities to pass ordinances prohibiting the use of any car within city limits unequipped with a projecting fender, but there are many cities which have failed, thus far, to take any steps toward remedying this evil. In consequence, the fenderless car continues to get in its deadly work with horrible regularity, not only on many of the lines in Greater New York, but in many other cities.

Many of the street railway companies, while complying with the letter of the law in regard to the use of a projecting fender, disregard its spirit by the use of a substitute which often is an additional menace to human life. For example, the fenders used by the Brooklyn Rapid Transit Company on most of its lines are clumsy, inefficient and dangerous home-made affairs, the use of which should be prohibited. Among others we have noticed the imperfect fenders used in Springfield, Mass.; Rochester, N. Y.; Grand Rapids, Mich. Human life should be valued more highly than it appears to be in these cities, and the local councils should take immediate action to compel the street car companies to equip their cars with suitable fenders for the protection of the lives of pedestrians. In the instance quoted above, the life of the little girl was taken by a fenderless car, while in Grand Rapids, last summer, the life of a man was destroyed just as effectively by a car which was fitted with a so-called fender. Wherever human life is sacrificed in this way, owing to the negligence or indifference of city officials, it is really nothing better than murder. This negligence is the more reprehensible because there are satisfactory projecting fenders manufactured, and many thousands are already in use in various American and foreign cities.

A short time ago, a car on Broadway, New York, which was not equipped with a fender, rand own and killed General Henry Harrison Boyce. The General had just taken lunch with his old friend, General Benjamin F. Tracy, and left him to cross Broadway to return to his office, when he was run down by a fenderless car. His life would have been saved had the car been properly equipped with a suitable projecting fender.

In dealing with the New York situation, the claim has often been made that projecting fenders could not be used on the Broadway cars owing to the congested traffic of that street. To all who are conversant with the facts, this claim will appear absurd on the face of it, for there are a hundred places in the city where traffic is just as great and where the projecting fender is used to great advantage. For instance, they are used on the Bowery, Park Row in front of the entrance to the Brooklyn Bridge; on West Broadway, where teams are so numerous that it is almost impossible for electric cars to run at all. The only reason they are not used on Broadway is because the Metropolitan Traction Company does not wish to go to that expense. Only about one-third of the cars operated by this company are equipped with projecting fenders. We can see no good reason why the Board of Aldermen should not pass an ordinance obliging this company to equip all of its cars with these fenders. That it would be the means of saving scores of lives every year there is no doubt. It is simply a matter of criminal negligence on the part of the city officials to permit the present condition of affairs to continue, and what is true of New York in this regard is true of every other city that neglects this important question.

Perquisites of City Officials

It is a time-honored custom for city officials of all grades to accept favors, and so called courtesies, from the corporations and individuals with whom they deal. This custom is vicious both in principle and practice. For a city official to accept so much as a cigar from any person or corporation wishing to obtain some privilege from the city is in the nature of a bribe. If, for example, an alderman accepts—as a great many do—free transportation on the trolley lines within the city, it places him in a position where he cannot pass unbiased judgment upon any matter affecting the rights of the transportation company. If a matter were to come up in council affecting the franchise of such a company, and if it were to the interests of the citizens that a certain request of the company should be denied, the alderman who was bribed would think more than twice before he would vote in the negative against any request which the company might bring forward. Whenever a city official accepts this, or any other kind of a courtesy, whether it be great or small, from a public service corporation, or from an individual, he ceases to become the representative of the people, and, in reality, is the special agent of the corporation or individual concerned. It is true that there are men large enough to accept such courtesies, and, at the same time, stand for the rights of the city when such rights are imperiled by an act or a request from some individual or corporation, but such men are rare; they are the exception which proves the rule. Every city would be better governed if it were made impossible for any of its employes, from the mayor down, to accept the courtesies referred to. There are many city officials who refuse to be thus bribed, even though there is nothing restricting their acceptance of such favors. Their numbers should be multiplied.

The Wail of the Reformer

We hear and read much in these days about the better municipal government which obtains in foreign cities. The would-be reformer points with the finger of scorn at the rottenness and corruption to be found in American cities. Admitting, for the sake of argument, that the worst which is claimed be true, in extenuation, it may be said: First, that the better governed cities of English and European countries are better governed because they have had a longer time to

practice. Good government is a matter of evolution, and when American cities have reached the age of those across the water, they will have attained a greater degree of perfection than may now be found over there. Second, the difference between the government of the foreign cities and our own is not so great as the reformer would have us believe. Any one who keeps in touch with the news and progress of foreign cities must know that there is a large amount of corruption in the conduct of city affairs constantly coming to the surface; everything is not so perfect as it is painted by the reformer on this side of the Atlantic.

While American cities are not models of good government in every particular, and while the officials are not always of the most desirable type, nevertheless, the administration of the affairs of American cities is attended with less corruption, less grafting than that incident to the management of quasi-public and other corporations of the United States. To substantiate this claim, we have only to call attention to the recent revelations connected with the failure of the asphalt trust, and the ship-building trust now so familiar to the general public. While we might find difficulty in proving our assertion, we are morally certain that it is true: there is scarcely a printing job of any importance in connection with any corporation of any size in which, at some point between the giving and the execution of an order, a rake-off is not realized by some of the corporation's employes. We maintain that city officials, taken as a whole, will compare favorably with the men in the employment of business corporations, and that the administration of the affairs of the average city is more economical, when all things are considered, than the administration of the affairs of a corporation of similar proportions. It is less possible, ordinarily, for grafting methods to be practiced in civic affairs than in those of private business, for the reason that there are a greater number of watchers to prevent it.

Poor Work of the Asphalt Trust

The Asphalt Trust seems to be slow to learn, even by bitter experience, that it can no longer bamboozle city officials into accepting its slighted work. For example, the Harrisburg (Pa.) *Patriot* in a recent issue said:

"The work of preparing Fifth street for the paving contracted for by the Barber Asphalt Company was interrupted for a short time by the condemnation of a quantity of sand and stone by Inspector Adriance, representing the city. The material was rejected and work was stopped until a new supply which conformed to requirements could be secured."

"Inspector Adriance said, when asked about the condemnation of the material that the sand was not good, that it had streaks of clay and was of a character too loamy for use on the concrete work. The stones were rejected for the reason that they were unevenly crushed and would not make good foundation.

"Mr. Adriance said that he had condemned stones for the same reason on other streets and had been compelled to reject a number of curbing stones because they failed to meet requirements."

Similar negligence on the part of the Trust is referred to in newspaper clippings from all over the country, wherever it has any contract for paving. It will suffice to cite another case taken from the Utica (N. Y.) *Press,* as follows:

"There is a great deal of criticism of the way the paving contract is being carried out on North Madison street by the Barber Asphalt Company. Much of the concrete (so-called) foundation has got to come up, for some one "forgot" to put in the cement. The concrete can be shoveled up like loose crushed stone, and it will all have to be shoveled up from Bloomfield to William street. City Engineer George Schillner ordered the poor work taken up, it having been laid under the inspection of John Nestle, who was appointed from the civil service list to look out for the interests of the property owners. M. B. Kingsley, another inspector, refused to accept this job, but the company continued to lay it just the same, and only stopped after Mr. Kingsley complained to the City Engineer."

If it had not been for the faithful service of the inspectors in the two cases above cited, the cities would have had an imperfect pavement. Evidently the inspectors could not be bought by the paving company. A much safer course to pursue would be to have nothing to do with the Asphalt Trust.

Corrections and Suggestions from Indianapolis

Indianapolis, Ind., October 20, 1903.

Editor, Municipal Journal and Engineer:

I want to thank you for the splendid manner in which my article on "Indianapolis: The Convention City," was presented to your readers in the October number. The illustrations were handsomely printed and barring a typographical error or two, such as the use of the word "contributions" for "contributes" in the third paragraph, and the line beneath the cut of the city building, which should have read: "Home of Police and Health Departments," instead of "Home and Police Health Departments," the story is presented in a most attractive manner. There was also an omission in the paragraph added at the end of the article, on wood pavements. It should have read: "It is an ideal pavement, if it is kept in good repair, especially for fine residence streets," etc., etc. The "*if*" is an essential qualification, as a more recent examination of the particular stretch of pavement referred to, proves. Up to within the past month, the pavement has shown little or no signs of wear, but the wet days and frosty nights of October have developed some weak spots; a "hump" has appeared in one portion of the pavement, and if the pavement is not now repaired promptly and carefully, it has seen its best days. The guarantee period has not yet expired, so possibly there is some hope of its being given the necessary attention which would double the life of the pavement.

The friends of wood block pavements would do well to inaugurate a school of instruction among municipal authorities and inculcate, if possible, the importance of making necessary repairs promptly. If this was done, the weak point of wood block pavement, that of durability, would be strengthened many fold. A long chapter might be written on this subject, "The Care and Preservation of Pavements." American municipalities are very derelict in these matters, and we never can hope to have thoroughly well kept streets, no matter what the paving material may be, until we learn to care for them properly, after they are paved.

The Municipal Journal and Engineer is a great aid to municipal officers. You are doing a grand work and doing it well. If you can bring the municipal officers of our land to a better appreciation of the importance of looking after improved streets more carefully, you will deserve much honor and praise.

Theo. A. Randall,
(*Editor, The Clay-Worker*)

Personalities

—Mr.. Robert P. Howell has been elected city engineer of Phillipsburg, Pa.

—At the election for mayor held in Indianapolis on October 18, Mayor Bookwalter was defeated for re-election by John W. Holtzman by a small plurality.

—A monument to James Robertson, the founder of Nashville, Tenn., was unveiled recently in Centennial Park. Addresses were made by Governor Frazier, Mayor Head and others.

—Mayor Devereaux, of Springfield, Ill., has been indicted for malfeasance in office by the grand jury because, in violation of his oath he permitted gambling houses, poolrooms and slot machines to run unmolested.

—Mayor Boyd, of Spokane, Wash., has been endeavoring to have signs put up on all graded streets. He has urged the council to appropriate the sum of $2,000 for the purpose, for he considers it a necessity and not a luxury and characterizes the present state of affairs in this regard as "almost disgraceful."

—The municipal association of Portland, Ore., has determined on the impeachment of Mayor Williams if all other means fail in the war against public gambling. A committee has been appointed to talk over this step with prominent lawyers and to decide on the proper methods to be pursued. The association succeeded in having prize fights suppressed and will now go after gambling.

—Mayor F. M. Menke, of Mattoon, Ill., has been convicted of malfeasance in office and the penalty may be placed as high as $10,000

and removal from office. A new trial has been moved by his attorneys. The defense placed the twin brother of the Mayor on the stand, claiming that it was he and not the Mayor that was seen by witnesses in questionable places. The two brothers are almost exact doubles.

—City Engineer L. E. Farnam, of Camden, N. J., has resigned as chief engineer of the Water Department, claiming that the duties of the dual positions were too onerous for his health. The Water Commissioners could not understand his statement that the results of his work were not satisfactory inasmuch as they all considered his work all that could be desired, but he stated that it was necessary for him to work nights and Sundays to attend to the necessary details and his health has suffered.

—Binghamton, N. Y., has been sued so many times for accidents due to defective sidewalks and has tried in so many ways to compel the property owners to keep their walks in decent repair that it now proposes to try a new way out of the difficulty. Street Commissioner E. L. Lewis has made plans that are endorsed by the members of the street board and which include the raising of $50,000 in bonds to run fifty years for the purpose of constructing walks. With this money available it will not be necessary to await the convenience of a property owner when a walk is out of repair, but the city can go right to work and fix it.

—As a ground work for the consideration of the needs of the water works Mayor Rodenbeck, of Rochester, N. Y., prepared a resume of the history of the water works. The Mayor claims that the supply of the present watershed will have been exhausted in five or seven years. The recent decision of the Court of Appeals granting a permanent injunction to the water works company as explained on another page has aroused the Mayor and he states that it is time for the city to wake up to the wrongs perpetrated on it by the public service corporations. "After nearly seventy years the city must take up the fight to preserve the integrity of its water supply."

—In submitting to council the estimates for 1904 Mayor Bookwalter, of Indianapolis, Ind., called attention to the fact that the amounts are over $25,000 less than for the previous year. A small increase was granted to park department, the Mayor feeling that every citizen would approve of this increase. An item of $2,500 was included in the estimates for the Department of Finance for the recodification of the laws and ordinances of the city and the Mayor considers this ver important work since no code has been made since 1894. The purchase of a new fire engine is asked in addition to other fire apparatus. The Mayor considers it wisdom and good business management to make adequate provision for the current expenses of the government at once rather than give the taxpayers "a ficticious benefit of a low tax levy with resulting bond issues and temporary loans."

Ordinance Not Void Because Specifications Were Lacking

THE (Ky.) Court of Appeals decided that it is sufficient to designate the extent of an improvement when it is stated that a certain carriageway was to be thirty-six feet in width and should be improved "by grading, curbing and paving with the vitrified brick or block pavement, with cornerstones at the intersections of streets and alleys, and footway crossings across all intersecting streets and alleys, in accordance with the plans and specifications on file in the office of public works." The court did not consider the ordinance void on account of uncertainty in that it provided that the improvements should be made according to plans in the office of public works, although at the time of the adoption of the ordinance there were no plans for the improvement on file in the said office. Nor was the ordinance void in that it might refer to plans to be made thereafter by the board of public works, because of the fact that this would be a delegation of legislative authority to a ministerial board. While there are many different kinds of brick or block pavement and several ways of laying the same, the general nature of the pavement is the same in all and familiar to those making such improvements. The drawings and documents made after the passage of the ordinance could not, however, be considered in aid of its terms, as they did not exist at that time.

Convention Dates

NOVEMBER

The Minnesota Charities and Corrections State Conference will be held at Minneapolis, Minn., November 3-5. Dr. H. A. Tomlinson, president, St. Peter, Minn.

The State Municipal League of Indiana will meet in annual convention at Terre Haute, November 11-13. Frederick Buckingham, Terre Haute, Ind.

AUGUST, 1904

The next session of the League of Georgia Municipalities will be held in Savannah the second Wednesday in August, 1904. Hon. Bailey, secretary-treasurer, Griffin, Ga.

Cannot Distribute Circulars in Yards

THE Supreme Court of Penn. has sustained an ordinance of the city of Philadelphia which prohibits the placing of circulars in yards or vestibules of houses. The defendant in the case argued that the ordinance was invalid in that the act was done on private property and therefore out of the city's jurisdiction; and also that the ordinance was unconstitutional because it destroyed or injured the advertising business. In rendering the decision the Court held that the circulars would finally reach the street, and therefore the prohibition came within the police powers. Furthermore the ordinance related merely to the distribution of circulars, and as they might still be left at houses in sealed addressed envelopes, the injury to the advertiser was not material.

Street Cleaning in Washington

THE small amount allowed by Congress for cleaning the streets of Washington necessitated a reduction in the street cleaning force and the suspension of the work for thirty days at the end of the fiscal year. The estimate for 1903 was placed at $205,000, but Congress appropriated $190,000 An increase in the pay of the laborers from $1.25 to $1.50 per day used up $15,000 of this amount, with the result that the appropriation was less than that for 1902. The services of ten hand sweepers were dispensed with and the area of 100,900 square yards of pavement turned over to the machine-sweeping schedules. The cost, per 1,000 square yards for the past year, was 17.4 cents as against 15.4 cents in 1902. This increase of 2 cents was due to the increased pay of the laborers.

The engineers of the department were not sure of the effect that the flushing would have on the asphalt pavements and the contractor, who did this work as well as the sweeping by machines, was permitted to flush but 60,000 square yards of pavement per night until it could be ascertained what damage was caused the pavement. Up to the time of this report the amount of damage is uncertain and it has not been definitely decided whether the benefits to be derived from the flushing do not outweigh the small damage done.

Last March the department purchased three two-horse sprinkler wagons for use on the principal paved business streets on which the street cars run. It was found that the fine dust that could not be removed by the sweepers or hand brooms settle in the grooves of the rails and in the depressions in the pavements near the tracks, to be blown up in clouds whenever a car passed. The sprinklers have kept down the dust most effectively.

Due to the growth of the city there was an increase of 3,362 tons of garbage collected in 1903 over the collections of the year before. The contract price for the collection and disposal of garbage and animals amounts to $51,600 per annum, with a rebate of 50 cents on the ton on all garbage over 20,000 tons, to be paid to the District of Columbia by the contractor. Nearly $7,000 in rebates were collected during the past year. A total of $1,606 was collected also from the contractor for failure to render service in accordance with the contract. Nearly $1,000 in fines were imposed during the year for neglect. The cost of this branch of the department was $42,356.97, a decrease of $3,712.53 as compared with 1902. A complete description of the methods employed in his department was given in the report.

NEWS AND PRACTICE AMONG THE CITIES

Dinner Held in a Sewer—Municipal Telephones Abroad—'Frisco Not to Have Municipal Street Railway—Chicago Needs Good Water

Iowa Leaguers Dine in Sewer

THE Iowa League of Municipalities held its annual meeting in Waterloo, Ia., on the 14th and 15th of October and some very interesting sessions were held. On the evening of the 14th took place one of the most unique affairs in the history of any such organization. This was the banquet that was held in the large sewer that Waterloo is building. About 300 members and guests of the League were seated at long tables placed in the portion of the sewer already completed, but not yet opened to service. The sewer is fourteen feet in diameter and will be 4,000 feet long, and so there was ample room for the tables and diners. The idea of holding the banquet there originated with Mayor P. J. Martin, of Waterloo. Mayor Samuel M. Jones, of Toledo; Mayor Harrison, of Chicago; and Governor Cummins, of Iowa, were invited to attend the banquet, but Mayor Harrison was forced to send a substitute.

Among the papers read at the sessions of the League were the following: "Municipal Franchises," F. K. Stebbins, Iowa City; "Concrete Steel Bridges," J. B. Marsh, Des Moines; "Municipal Accounting," L. A. Wilkinson, Des Moines; "The Responsibilities of Local Board of Health," Dr. J. F. Kennedy, Des Moines.

Cedar Rapids will be the next meeting place of the League. The officers for the coming year will be: President, P. J. Martin, Waterloo; first vice-president, A. N. Alberson, Washington; second vice-president, C. D. Huston, Cedar Rapids; third vice-president, A. H. Northrup, Fort Dodge; secretary, F. J. Pierce, Marshalltown; treasurer, Richard Valentine, Mason City.

Health Conditions in Louisville

MUCH improvement in the health conditions of Louisville, Ky., was shown by the report of Dr. M. K. Allen, city health officer. He treats the subject of consumption at length, making suggestions to the patients and those having charge of them. He considers expectoration as the most prevalent means of spreading the disease. He places pneumonia and diphtheria on a par with consumption as to danger and urges the use of antitoxin. Dipththeria was unusually fatal during the past year and he urges that every one be vaccinated. Dr. Allen earnestly recommends one or more hospitals for contagious diseases. He also recommends a city abattoir as it would greatly improve the city's health. He suggests the sprinkling of the streets with oil or with a solution of diliquescent salts that are cheap and odorless. He wants the sale of the toy pistol prevented. The death rate of Louisville was lower than for several years, having been 16.8 to the 1,000, the white death rate having been 14.9 and the colored 24.78. Dr. Allen earnestly urges the erection of at least one more public bath and a floating bathhouse on the river where children could be taught to swim. Two baths should be erected for the colored.

Municipal Telephones in England

AT the present time there are but three municipal telephone systems in operation throughout England, but there are thirteen systems being placed in operation or projected under licenses granted under the Telephone Act of 1899. The licenses are dated from 1900 to 1902, and will extend in the different systems until 1911 to 1927. It is probable that many more of the English cities will ask for licenses, and the days of the National Telephone Company are numbered, for, while some of the municipal systems may not be run so as to be profitable, the majority are sure to be, and the people will never return to the high rates of the private concern after once having been shown that the city can supply them with a good service at low rates. Glasgow is proving how well such a system can be run, and the rates there for unlimited service over 143 miles of lines are $26.25 per year, with an alternate tariff of $17.50 and 2 cents a message. After all expenses, interest, etc., were paid, the net surplus for 1902 was $1,991.87.

Duluth Tries New Method of Paving Alleys

INSTEAD of having gutters on either side of the alleys in Duluth, Minn., as has been the custom in the past, there is to be a single gutter along the center. While the plan is not a new one by any means, it has not been tried in Duluth and City Engineer Patton has been working out a plan for his city. The alley will be paved with brick on Telford foundation and a filler of tar or cement will be used. The cement filler is favored by the City Engineer but the fact that the alley cannot be closed long enough to permit of the cement hardening will compel the use of the tar. Catch basins will be installed along the alleys and the walk crossings at either end will be rounded up so that they will remain dry instead of getting muddy with every heavy rain.

Fine Financial Condition of Chattanooga

THE past year in Chattanooga, Tenn., has been a good one, from the viewpoint of the city's finances, according to the statements of City Treasurer Gillespie and City Auditor O'Donohue. A balance of $18,762.17 is on hand, which will be used to pay the interest for the new year. The collections, it was claimed, were the best in the history of the city, there being but few delinquents. Licenses netted a good sum and fines from the city court helped to swell the total. Nearly all the departments kept within their budgets, although the small-pox situation caused a deficit of $15,000 in the health department. The increase in salaries caused a deficit in that account. This good showing has been made on a rate of $1.45 as against $1.50 for which many contended last year. The Treasurer reported that it cost the city $331,901.66 to run itself and the receipts aggregated $342,811.12.

No High Bill Boards in Passaic

HEREAFTER in the city of Passaic, N. J., no sign board of wood or metal higher than eight feet above the surface of the ground and extending into it, or within less than ten feet of the street line shall be erected or allowed to stand. All sign boards must be thoroughly supported and braced and a permit must be obtained before any such board may be erected. If at any time any board shall become dangerous, the superintendent of buildings must notify the owner to repair the same or to remove it within at least five days as the superintendent shall deem necessary. If the owner or lessee of the board does not comply with the order, the superintendent is to repair or remove the board and recover by law suit the expenses attached to the work provided the cost be not paid within ten days of service of a statement thereof.

Company Cannot Sell Water in Rochester

THE Court of Appeals of New York, has affirmed the permanent injunction granted the Rochester and Lake Ontario Water Company, restraining the city of Rochester from interfering with the company's laying its water mains along the right of way of the New York Central Railroad in the city. The Appellate Division had affirmed the injunction already held that the company had no right to sell any water in the city, even to the railroad over whose right of way it ran. The Company was incorporated to supply some small places in and around Rochester, and desired to cross the city with its mains to reach these localities. The city officials felt that it was only a trick to get its mains into the city that it might compete with the municipal waterworks plant, and consequently they used every means possible to keep the Company out. As the matter stands now, the city has been successful in preventing the sale of water within its limits, although it has not been able to keep the Company from laying its mains on the private right of way of the railroad.

Must Not Solicit on Street

It will no longer be permitted to solicit in any manner, any business, occupation or employment in Cincinnati, O., within places adjacent to public buildings, or within ten feet of any regular "street crossing" that leads to any railroad depot, hotel, theatre or other public building, or on the sidewalk in front of such places within ten feet of the entrance. A fine of from $5 to $25 is to be the penalty for violation.

No Municipal Street Railway for San Francisco

The efforts of San Francisco, Cal., to experiment in the ownership of a street railway have met with defeat, for, when the project was submitted to the voters recently, 14,381 votes were in favor of it and 10,755 against. It takes two-thirds majority in favor of such a project to secure its adoption, and, in this instance, therefore, the bond proposition was lost by 6,083 votes. Last April the Board of Supervisors ordered the Board of Public Works to draw up plans and estimates of the cost of acquiring the cable road on Geary Street and of improving it. The city attorney had given his opinion that the city had the right to use the street for a municipal street railway. The election, however, has checked those who have been in favor of municipal ownership. It is probable that agitation will be kept up and at a future date the project may pass. In England, municipal ownership of street railways is an established fact in many cities, although in every instance much opposition is met with from the opponents of the idea.

Big Bond Issue Voted in 'Frisco

Ten of the twelve projects on which citizens of San Francisco voted on September 29 were carried by a two-thirds majority. Bonds to the amount of $159,000 for acquiring lands for Twin Peaks Park and $205,000 bonds for laying out St. Mary's Square did not pass although they received a majority of votes. Bonds were voted for the proposed city and county hospital, for a new sewer system for schools and playgrounds, for improving streets, for the county jail, public library, Telegraph Hill and Mission parks, etc., were carried. The detailed amounts for each of these projects were given in the October issue of The Municipal Journal. Considering the nature of the election the vote was a large one, and it is claimed that it would have been larger if a misunderstanding on the part of many electors had not arisen. Many failed to register twenty-five days before the date of voting. The largest vote was in favor of the city and county hospital, followed closely by the school house and new sewer system propositions. The total face value of the bonds for which the people declared is $17,771,000. The bonds will be sold as the money to carry on the work is required, and, as a good margin has been allowed, all the bonds may not be needed.

Good Water Needed in Chicago

Something must be done to make the water supply for the Chicago schools safe for drinking. The Milk Commission, of which Mrs. George M. Moulton is president, has suggested to the Board of Education that pasteurized milk be placed on sale at all the schools at 1 cent a bottle of three ounces. Experiments of this plan were tried in one of the Thomas Hoyt schools, when the water supply was shut off from the building while some repairs were being made. A Pasteurizing plant was installed and the first day over 300 bottles of milk were sold to the children at 1 cent a bottle. The question of expense has defeated all previous plans for supplying pure water. These included plants to boil the water or the installation of filters.

Special Paving Benefits Defined

In an appeal from an assessment of paving on a certain lot in Marshalltown, Ia., Judge Caswell, of the county court, decided that the law required that the assessments must be in accordance with the benefits received. He criticises the city council because it did not take the necessary time for ascertaining what were the benefits and says that the members probably concluded that each one's share was not any more than the special benefits. Regarding the determination of the special benefits, he said: "I think the proper way to get at the special benefit is, to take the market value of the property immediately before the improvement is made, then the market value of the property immediately after the improvement is made, subtract the one from the other, and then take from the general benefits, and then you have left the specific benefits." He does not define, however, what constitutes the general benefits on the method of ascertaining them.

Liable for Defective Sewerage System

The Appelate Division of the (N. Y.) Supreme Court has held that where a city permits its sewer system to get out of repair, the householder whose property is damaged can recover not only for the injury to the property, but also to the health of the householder. The city of Hudson constructed a sewer in such a negligent manner that after several years' use it filled up, with the result that the property and health of a householder was damaged. The city argued that damages could not be recovered for injury to health. On the other hand, the court decided that the city should have used reasonable care in building the sewer and keeping it in proper repair. Because of the negligence of the city a trespass was committed upon the householder's premises by allowing the contents of the sewer to overflow and a nuisance was thus created. Not only could the owner of the premises recover damages on account of injury to the property, but also damages which are the natural result of this wrong.

Can Assess Full Foot-frontage of Corner Lots

A suit was recently won by the city of Cincinnati, O., against a tax-payer that will mean thousands of dollars saved to the city. The point involved was the collection of assessments against corner lots for street improvements. Before the suit, in improving a side street, the property could be assessed only for as many feet along the side as it had frontage. The Legislature passed an act allowing Cincinnati, Toledo and Springfield to assess the full length of the side. This was declared unconstitutional by the Court of Insolvency, but an appeal by the city to the Circuit Court established the ruling that, even if the act was invalid, the city was not estopped from collecting the full amount if it were shown that the benefits derived by the property from the improvement equaled the assessment. The result of this decision is that, while heretofore the city had to pay the expense of paving about the corners of street intersections at a cost of about $2,800 per intersection, the property owners on the corners will have to pay for the greater part of these improvements.

Pure Food for Memphis

An ordinance to regulate the manufacture and sale of food products has been before the council of Memphis, Tenn. It provides that no one may sell or make for sale any article of food that is adulterated, misbranded or unwholesome. It then proceeds to define these terms. viz: "Food" is to include every article used for eating or drinking and "misbranded" shall apply to every article of food, the package or the label of which bears any statement that names any ingredient not contained in the article, or which shall not give in full the names of all substances in the article in a measurable quantity; "adulterated" means the treatment of any food by mixing with it any article that will lower or injuriously effect its strength or quality, the substitution of an inferior substance for the article, the abstraction of any portion of any valuable constituent of the article, the imitation or sale under the name of another article, the coloring, coating, powdering, etc., whereby damage is concealed, except as regards the coloring of oleomargarine or butter, and the introduction of poisonous ingredients, antiseptic, preservative or alum; "unwholesome" shall be applied to food that is in whole or part diseased, filthy, decomposed, or that is from any animal that has died otherwise than by slaughter, or a substance that is manufactured or handled by persons exposed to contagious diseases.

Milk that has come from cows affected with tuberculosis must not be used. No one may slaughter or sell any meat that has not been inspected and approved and no meat shall be carried through the streets without being protected from dust. A permit must be obtained by every one who sells meat or fish, or owns slaughter houses, butcher shops, fish markets, etc. A penalty of from $10 to $50 is provided for every violation of this ordinance.

American Society of Municipal Improvements

The tenth annual convention of the American Society of Municipal Improvements was held at Indianapolis, October 20 to 22, six sessions being held. The headquarters were at the Hotel English, where the delegates reported, and the meetings were held in the assembly rooms of the Commercial Club. President Frank E. Gavin extended a welcome to the members on behalf of the Commercial Club. Vice-President G. M. Ballard, of Newark, N. J., responded. Mr. Charles C. Brown, editor of *Municipal Engineering*, read the report of the Committee on Municipal Data, of which he is chairman. This committee has been at work for several years in its efforts to secure a uniformity in the compilation of municipal reports. This year the committee conferred with the officials of the United States Census Bureau for the purpose of enlisting their aid in collecting uniform statistics, and the Bureau, it is stated, will take up the work this year. Forms of reports were drawn up by the committee for submission to the Society. When they are endorsed they will become a standard for reports of different city departments for use by the United States Census Bureau. The first day closed with a banquet at the Commercial Club, at which Mayor-elect Holtzman spoke.

At the first session on the 21st, Mr. George M. Ballard, chairman of the Committee on Taxation and Assessment, reported. He also spoke on "Municipal Taxation." He recommended that the laws permitting exemptions from taxation should be repealed because taxes should be assessed against all alike. Real estate should be first assessed, so that proper equalization might be determined and then betterments could be considered under uniform rules according to their true value. All personal property should be taxed.

A paper on the "Sanitation of Public and Industrial Buildings" was read by Professor Severance Burrage, of Purdue University. He emphasized the fact that while quasi-public buildings are carefully looked after as regards their cleanliness, etc., they receive little sanitary attention. The committee on disposal of Garbage and on Street Cleaning reported through its chairman, Street Commissioner John Jones, of Toronto, Ontario. He also discussed the methods employed in Toronto for destroying garbage, a garbage destructor being used. He stated that it cost about $5,000 to put up the destructor; its capacity is sixty tons and the cost 20 per cents per ton for operation. Mr. Ernest Adam, engineer of the Department of Streets and Highways in Newark, N. J., read a paper on "Street Improvements in Newark," and Professor A. Prescott Folwell, of Easton, Pa., talked on the "Perviousness of Sewers." He suggested remedies for the leakage. A general discussion of the subject followed.

In the afternoon a drive about the city was enjoyed, the Engineering Department having furnished a schedule of the improvements with the dates when they were completed. The evening session was devoted to Indianapolis. "The Paving System of Indianapolis," by J. B. Nelson, city engineer of that city, was read by Mr. Walter Buehler, because of the absence of Mr. Nelson, whose father had just passed away. Mr. Charles C. Brown, former city engineer, talked on "The Sewer System of Indianapolis," Mr. P. C. Reilly discussed "The Development of the Kreodone Pavement," and Mr. F. A. W. Davis, general manager of the Water Company, spoke on "The Water System." Other papers were: "The Central Heating Plants," by W. K. Eldridge, C. E.; "The Park System of Indianapolis," by Park Commissioner George Merritt, and a "Description of the Street Railway System, Including the Interurban Terminal Plants," by Mr. Thomas B. McMath, engineer of the Indianapolis Terminal and Traction Company.

At the morning session of the third day it was decided to hold the next meeting in St. Louis at the time of the Exposition. The officers for the coming year were selected as follows: G. M. Ballard, of Newark, N. J., president; Prof. A. Prescott Folwell, of Easton, Pa., first vice-president; C. C. Brown, of Indianapolis, second vice-president; W. B. Howe, of Concord, N. H., third vice-president; G. W. Tillson, of Brooklyn, N. Y., secretary; F. J. O'Brien, of Oswego, N. Y., treasurer; Emmet Steece, Burlington, Ia.; B. E. Briggs, Erie, Pa., and Alcide Chausse, of Montreal, finance committee.

City Engineer E. A. Fisher, of Rochester, N. Y., chairman of the committee on Electric Street Lighting, read its report, in which he said that the usual period for contract was five years and that there has been a general decrease in the cost of light and an increase in the amount furnished for a given sum. He places little faith in the statistics from municipal plants and favors, for the present, the Boston system of regulating rates subject to periodical revision. Mr. A. S. Hatch, engineer of the Lighting Commission of Detroit, presented a paper on "The Records of the City Electrician," in which he described a card system for keeping a complete record of all wires. Mr. H. W. Hillman, of the General Electric Company, discussed the question, "Have Improvements in Electric Arc Street Lighting Kept Pace with Other Municipal Improvements?" His talk was presented to the members in pamphlet form, with illustrations of new street light posts, etc. The report of the Committee on Water Works and Water Supply was presented by Mr. Morris R. Sherrerd, of Newark, N. J. He discussed the construction of reinforced sixty-inch concrete conduits.

At the afternoon session Prof. A. N. Talbot, Champaign, Ill., chairman of the Committee on Review, read the report of that body, in which he discussed large engineering works undertaken by the municipalities during the past year. "The Maintenance of Asphalt Pavements" was the subject of a paper by Mr. W. J. Stewart, first assistant city engineer of Rochester, N. Y. He presented figures showing the average cost of maintenance for several years, in 1902 the cost being 4.72 cents per square yeard. The City Engineer's Department supervises all repairs and indicates the places where patching is to be done and also the exact amount needed. Superintendent of Keney Park, G. A. Parker, of Hartford, Conn., and chairman of the committee on Park Improvements and Maintenance, insisted that parks are absolute necessities in city life and that the park area is entirely too small, the cities represented by the Society having but 40,511 acres. The tendency is toward increase, and the needs are being recognized. He called attention to Ottawa, Canada, as a city of model parks.

Other papers that were read during the afternoon session were the report of the Committee on Street Paving, by N. P. Lewis, of New York, chief engineer of the Board of Estimate and Apportionment; "The Problem of the Cobblestone," by G. W. Tillson, chief engineer of the Bureau of Highways, of Brooklyn, N. Y.; "The Problem of the Cedar Block," by John Erickson," city engineer of Chicago; "Recent Practice in Rectangular Wooden Block Pavements in New York City, Especially as a Fireproof Roadway for Bridges," by F. A. Kummer, of New York City; "Single Course Brick Pavements," by Fred Giddings, city engineer of Atchison, Kan.

At the last session of the convention the Committee on City Government and Legislation reported through its chairman, Mr. John Rowson, of the Board of Public Works, Grand Rapids, Mich. Mr. C. A. Kenyon, of Indianapolis, read a paper on "A Discussion of the Bitulithic Pavement," which will be found elsewhere in this issue.

City's Right to Intervene

Justice Herrick, of the N. Y. Supreme Court, has given a decision that affects every municipality in the Empire State. The case in point was a special franchise tax laid upon two Buffalo railway companies. The companies claimed that, while the city taxed all city property at a valuation of 70 per cent., the companies in question were assessed at full value of their property. The justice at first granted the relief asked by the companies, but, when the city of Buffalo asked leave to intervene and become a party to the case, it was premitted to do so because the city asserted that it assessed all property at the outskirts of the city at full valuation contrary to the claim of the companies' attorneys. Justice Herrick then granted an order setting aside his former decision and affirms the right of a municipality to attack the valuations of the State board of tax commissioners and show that it has assessed property at its full value and also to show if it has sustained any loss by the taxations of the board. Thus a city has the right, after the State board has fixed the tax on any franchise of a corporation, of intervening to have the tax set aside or corrected if it can show that it will sustain any unjust loss of revenue thereby.

Electrolysis in Rochester

THE damage caused to underground pipes by stray currents of electricity has been occupying the attention of City Engineer Fisher, of Rochester, N. Y., and a couple of electrical experts. According to Mr. Albert B. Herrick, one of these experts, the conditions in Rochester are very favorable, and but little electrolysis has occurred since measures were taken to prevent it. These included the effective bonding of the rails of the electric railway, and the "draining" of the water pipes. The object of the second method is to prevent, as far as possible, the escape of the electricity that has already entered the pipes, and the conducting of it to the power house by connecting the latter to the pipes by means of a wire. Mr. Herrick is quoted as saying that, "the double trolley wire system is dangerous. Cincinnati and Washington have the double trolley system in service, but while the danger from electrolysis is greatly reduced, practice has shown that where there is a 'ground' the injury from electrolysis is tenfold as great as in the single trolley system." City Engineer Fisher has been making an annual survey of the water pipe system, and has employed the most practical methods to prevent electrolysis wherever evidence of the same has appeared.

It is to the interest of the electric railway company to assist the city in preventing electrolysis, which involves a loss to the company, because the current on its way back to the power house, if it must jump around joints on the pipes, meets with much greater resistance than if it had a continuous line of travel, consequently the pressure of the current must be greater at the start than if a continuous return line was afforded. It is this jumping back and forth, either between the rails and the underground pipes, or over the joints in the pipes or rails, that causes the latter to be eaten away. No damage would result to either the rails or the pipes from the electric current if sections of both were so closely connected that this jumping would not be necessary.

Garbage Disposal in Iowa Cities

THE cities in Iowa are struggling with the question of garbage disposal, and there is not a city in the state—according to *Midland Municipalities*—that has a system of garbage disposal that gives even a reasonable degree of satisfaction, but every council has a committee investigating the subject, with the hope that, within a year, some of the cities will have installed an adequate system. At present the methods of garbage handling in several of the cities is as follows:

Cedar Rapids.—Has a population of 25,656. The garbage is dumped into the river below the city. The work is done by contract, for which $2,550 per year is paid. The city may put up a garbage plant.

Council Bluffs.—This place has 25,802 population. The citizens must remove garbage from their premises twice a week, the city furnishing the dumping ground at the cost of $40 per month. The cost to the citizens is $1 per load, and disposed of either by burial or dumping in the river.

Des Moines.—About 100 tons of garbage per day is dumped. The city has a population of 62,139, and individuals pay the cost of hauling. The city health officer removes the garbage, and assesses the cost on all who fail to do it themselves.

Davenport.—This place has a population of 35,254 and pays $3,000 per year to collect city garbage. Four teams collect the refuse in wagons made by the United States Sanitary Company of Washington, D. C. Each man and team is paid $3 per day, and he works six days during the summer and five days during the winter per week. The garbage is dumped in the middle of the Mississippi.

Marshalltown.—In this city are 11,544 inhabitants. The citizens pay the cost of hauling, which amounts to 50 to 75 cents per load, and the city furnishes the dump.

Muscatine.—Has 14,073 population, and disposes of about 100 loads of garbage per day. Over $2 to $5 per month is paid by the citizens for having it hauled to the river and dumped.

Oskaloosa.—This place has 9,212 population. The citizens pay from 50 to 75 cents per load for garbage removal. The method is faulty, inasmuch as tenants often refuse to dispose of the garbage, and the cost of removal is taxed on the property holders.

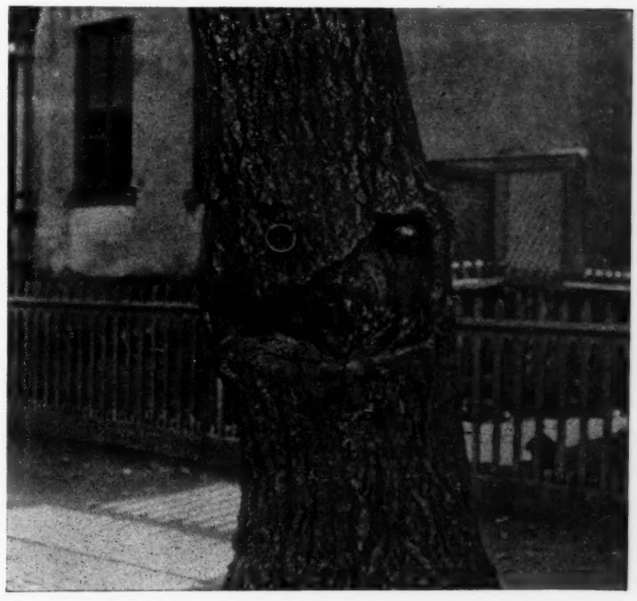
Ottuma.—Has a population of 18,197. The citizens pay for hauling away the garbage, and the city furnishes the dump.

Sioux City.—Has 33,111 population, and last year spent $11,728.45 collecting garbage. Nine teams and ten men work every day and haul about forty loads of garbage and thirty tons of manure, and the dumping grounds have been filled up and new ones must be secured. The wagons are owned by the city, but the teams are owned by the men.

Waterloo.—This place has a population of 12,580 and requires that citizens keep their premises clear of garbage. The city furnishes the dumping ground. A cost of $1 per load is paid for removal by the citizens.

Tree Planting in Washington

DURING the past year some 2,310 trees were planted in the streets of Washington, D. C., under the supervision of Mr. Trueman Lanham, Superintendent of Parking. This number is less than that of the trees planted the previous year by 290, but the excessively wet weather during the spring rendered the soil unfit for handling, and it was not possible to set out many trees at that time. Warm weather also caused the trees to leaf very rapidly, and it was not possible on that account to transplant them.



Courtesy Dr. E. H. Jenkins, New Haven, Conn.
TREE USED AS HITCHING POST—INJURED BY HORSES

The department maintains its own nursery, and is continually adding to the number of seedlings. Norway maples, red oaks, American elms and sycamores were set out this year, and, deducting the number of trees planted on the streets, makes a total of 23,090 now in the nursery. There were removed from the streets and parks 534 trees, of which 250 were dead or nearly so. It was found that of the number dead sixty-six had, without doubt, been killed by gas, and about seventy-five destroyed by street improvements, such as the re-setting of curbs and the laying of cement walks. From the fact that the greater number of dead trees stood in brick sidewalks, the general idea that cement walks are injurious to trees does not seem to have been substantiated. The emergency fund of the department was used to destroy the number of caterpillars that appeared in June, and no appreciable destruction was caused by them.

Superintendent Lanham reports that he watched carefully the condition of trees planted in cement walks in spaces 3 x 3½ x 7 feet where the roadways were asphalt; thus far, he has noted no apparent difference between the condition of these trees and those growing in parks or brick sidewalks, but he says that it does not seem possible for them to continue to prosper as they did in the earlier stages of their existence. In the future he suggests that where asphalt roadways and cement walks are laid the spaces reserved for the trees be left as large as the available area will permit.

No matter how many beautiful trees are set out on streets, if they are not protected against injury from horses, their life will not be long. The accompanying illustration is typical of many city trees. All trees should be carefully protected by some good guard that is not easily broken, and which will protect the bark from horses. Trees are often ruined because of the lack of protection afforded by such a guard.

Street Tree Planting

THE bulletins that are sent out by the secretary of the New England Association of Park Superintendents always contain a mass of information given by the different members from their experience in park work. The latest bulletin was devoted to street trees, and so will be especially of interest to cities. Mr. J. A. Pettigrew, superintendent of parks, of Boston, referring to the care of trees, says the salient points are: "A good foundation for growth, by providing a good bed of loam for the roots; a healthy young tree, nursery grown, of not more than one and one-half inches in diameter, for planting; a stout box guard for protection from vandal hands or stray horses; a little pruning, if necessary, to maintain symmetry of proportion; mulching and watering in dry seasons for a few years after planting; a regular system of fertilization, and protection from insect pests." Regarding the enemies to trees, he states that about one-half of the Boston street trees are injured by the gnawing of horses. One-third in addition are injured by the linemen. Others are injured by being used as guy posts by contractors. "The greater part of this destruction is caused by lack of appreciation or knowledge on the part of employers of labor and of public officers, of the value of trees to a city." Those who do not plant trees when the opportunity offers are also enemies as well as those who will not permit the cutting out of a tree to prevent crowding of its neighbors. Boston trees have suffered greatly from this. The same interest should be taken in regard to the street trees as is given to every other public interest.

Mr. J. H. Hemingway, of Worcester, gave some instruction from his experience as to how to plant trees on the streets. The best tree is of two-inch calibre three inches from the ground, straight, nine feet to the first branch and without a crotch, having a good leader with fine roots. An elm tree will grow from two to three feet through at the bottom, therefore the folly of planting within eight or ten inches of the curb. A hole to contain one-half cubic yard of loam should be dug if the soil be poor. Inasmuch as the tree has received a shock in transplanting, it should not be given at once a quantity of rich soil. The roots should be first covered with very poor earth, putting the loam outside of this.

The charters of the cities of the second class in New York State provide that the superintendent of parks, under the direction of the commissioner of public works, shall have the custody, care and control of all parks and the streets passing through or intersecting the same, and all the shade trees of the city. Under this law, Albany has looked after the shade trees on the streets, checking as far as possible the devastation wrought by the linemen of the corporations. Every city should have a city forester and men under him to care for the trees on the streets. An instance is cited of where a gas company laid a line of mains without supervision of the city authorities and about thirty large elms along the line soon died. Investigation showed that the earth was saturated with gas, which had killed the roots of the trees. The company was compelled to recork the joints of the pipes and to replant new trees, but no money could recompense the city for the loss suffered. No work should ever be permitted on the streets without the supervision of the city officials. Damage to trees a city forester could prevent and should be given the power to do so.

Regarding the planting of trees on streets, Superintendent G. X. Amrhyn, of New Haven, says that they should be planted not less than six feet from the curb, placing them between the walk and house line. If this cannot be done, it is better to give up planting. Engineers should keep in mind that trees are necessary to cities and should allow for them when laying out streets, providing for wide walks to give the trees a large body of good soil. Trees should be kept about twenty-five feet high for ordinary streets. Elms should be planted from fifty to seventy-five feet apart and maples from thirty to thirty-five. He does not think the American elm well adapted to streets, but for wide avenues and squares.

Of course, different opinions were expressed by the superintendents as to the kind of trees for streets. The horse chestnut is favored by Superintendent Amrhyn, while Mr. James Draper, of Worcester, disagrees with him on account of the small boy, who greatly injures these trees in his clubbing them for nuts. Superintendent Pettigrew favors the gingko because of its lightness of foliage. The pin oak, it was claimed, was as rapid a grower as the maple, and gave 50 per cent. more shade, has a long life and few insect enemies. The ailanthus is greatly praised by Superintendent Pettigrew because of its hardihood. The objection on account of the ill-smelling staminate flowers can be overcome by cutting them off or choosing the other kind. The white willow thrives well under hard street conditions. The American elm needs a good and a fairly moist soil, as does the European linden, but both make beautiful trees. The latter must be protected from the tussock moth. The soft maple is too heavy for streets and needs lots of sun, air and good soil. The paper mulberry is recommended as hardy and not affected by smoke and fumes.

Mr. G. A. Parker, superintendent of Keney Park, Hartford, Conn., calls attention to the influence trees have on health conditions of cities, keeping the soil sweet and clean. They are one of the best drains a soil can have, pumping barrels of water in a season and giving it off into vapor. This movement of water prevents stagnation and brings air into the soil for the bacteria to use. Mr. Parker ventures the opinion that "a city, or a street of a city, whose soil condition is such that a tree cannot exist, is unfit for habitation, and a street, whether paved or unpaved, where the earth underneath the pavement, even if asphalted, is so full of gas, sewage and filth that a tree will not grow and where the air in the street is too impure for tree life, and where the sunlight, or the want of sunlight, and the heat are such that the trees do not flourish, is unfit for human habitation and is debilitating to everyone who uses it."

Provisions in Recent Railway Franchises

A NUMBER of franchises for street railways have been under consideration by several city councils and the provisions contained in the bills will be of interest as showing that the councils are waking up to the fact that they have no right to give away the use of the streets without requiring an adequate return to the city. The Traction Company of Harrisburg, Pa., was permitted to extend its lines on its agreeing to pay to the city 3 per cent. of its gross annual receipts. This payment is to be in lieu of any license fees or taxes which were heretofore imposed and of the sweeping and cleaning of its tracks. It must, however, keep the space occupied by its tracks and nine inches on either side, paved with the same material with which the rest of the street is paved and maintain it whenever the said space does not exceed five feet two inches.

Rigid conditions were proposed before the council of Memphis, Tenn., would grant a franchise to a street railway. They included a deposit of $30,000 cash as earnest money, and a $30,000 indemnity bond, a franchise for but thirty-five years, the paving with asphalt of a number of streets to cost about $80,000. The company would have to buy the right of way in one instance, open the street and pave it. The company must pave the streets along its lines and pay a greater percentage of gross receipts than it offered. It is to pay the city 1 per cent. for first five years, and 2 per cent. for the next ten years and 2½ per cent. for twenty years. The city reserved the right to govern the price of fares in the future and this included the right of reducing them from 5 cents to 4 or 3. The promoters of the new road will fight these conditions.

The conditions included in a franchise recently granted to a street railway in Oakland, Cal., were much easier than those proposed for Memphis. The franchise was granted for forty years to the highest bidder which offered the magnificent sum of $500 for the privilege of making money on the streets of the city. A five-cent fare was permitted and the company is to pave the space between the tracks and two feet on either side thereof with the material with which the rest of the street is paved and keep the

same in repair. Mail carriers of the Government while in the actual discharge of their duties are to be carried free. After the first five years the company is to pay annually an amount equal to 2 per cent. of the gross receipts.

In Toronto, Canada, things are done a trifle differently. The city is the owner of all the real and personal property of the street railway system and leases the system to a private company. A twenty-year agreement was entered into between the company and the city and this may be extended every ten years provided the service has been satisfactory to the authorities. The sum of $800 per year is paid by the company for every mile of single track. Every month the company pays a percentage of the gross receipts from passengers, freight, express and mail. On receipts up to $1,000,000 per year, 8 per cent. must be paid; between $1,000,000 and $1,500,000, 10 per cent.; between $1,500,000 and $2,000,000, 12 per cent.; between $2,000,000 and $3,000,000, 15 per cent.; and all gross receipts over $3,000,000 per year, 20 per cent. The system of bookkeeping and accounts is also subject to the approval of the city treasurer and auditors and extensions of the lines are to be made only on the recommendation of the city engineer with the approval of the council. Cash fares are 5 cents; on night cars double this rate. Workingmen's tickets, good between 5 and 6:30 P. M., and before 8 in the morning, are sold eight for 25 cents. Tickets good for all times are sold at the rate of twenty-five for $1 and another class at six for 25 cents. School tickets may he had at ten for 25 cents, to be used between 8 A. M. and 5 P. M. except Saturdays and Sundays. Transfers are given in all directions. Cold, dirty or old cars may be ordered out of service by the city inspectors.

Cincinnati has permitted the railway company there to substitute an additional 1 per cent. of its gross annual receipts in lieu of all car license fees, heretofore paid according to its franchise.

Water Works Situation in Houston

THE water question in the city of Houston, Texas, has been a very peculiar one. The city sued the Houston Water Company for a total of about $116,000 for the loss of the market house, and the suit is based upon the franchise under which the Company is now, and was operating, when the market house was destroyed by fire. Later, the council declared the franchise of the Company invalid, and a suit was also brought for the forfeiture of this franchise. At the time of writing, there was danger that the Water Company might claim that it desired only to do a legitimate business, and, inasmuch as its franchise had been revoked by the council, it would cease to supply the city with water until the question was settled. This contract to supply the city with water was made in November, 1878, and now the city alleges that the contract is void because it was an attempt to create a monoply, which, it was declared, is contrary to the constitution of the state, which provides that "perpetuities and monopolies are contrary to the genius of a free government, and should never be allowed." The city claims that the contract has always been void, because of attempts to compel the city to buy the entire works and property of the Company, or else permit the Company to operate under the contract perpetually. The clause upon which this is based states that the franchise was to run for a period of twenty-five years, at the end of which time the city was to have the privilege of buying the entire works at their appraised value. In the event of the city not buying at that time, the franchise was to run, and the right to purchase the works was to be permitted to the city every five years. Granted that this franchise was legal, the city then claims that it should be forfeited because the Company has failed to furnish a pure and wholesome water to the citizens; because it has not furnished sufficient pressure for the extinguishment of fires, and because it has not extended its system and placed a sufficient number of hydrants on the streets, as the city required it to do. How long it will be before the matter can be settled in the courts, there is no knowing, but it appears that the city must win because of the evidence it will be able to submit. It is to be hoped that the city will install its own waterworks, and thereby make itself independent of all private concerns.

Street Railways in Leipzig

THE first street car line was installed in Leipzig, Germany, in 1872. This was run by horses until 1895, when concessions were granted to two companies for forty years. At the end of that time, all the lines and rolling stock are to revert to the city, with the exception of the grounds, buildings, machinery, and such motor cars as are built within the last five years of the grant. The city may buy the grounds, buildings, etc., at the price at which they are assessed, and may take over the lines after twenty years, upon payment of the full assessed value; after twenty-five, thirty or thirty-five years, in addition to paying full price for the grounds, etc., 75, 50 or 25 per cent. of the assessed value of the road beds, respectively. Should the city take over the lines at the end of twenty years, it must pay thirteen times the amount the net profits have averaged during the five years just preceding; after twenty-five, thirty or thirty-five years, it must pay ten and three-quarters, eight or four times the average net profits respectively. From the receipts, the running expenses—4½ per cent. for dividends upon the capital stock and a smaller sum for interest on the bonds—are to be deducted to determine the net profits.

Failure to run cars to comply with the ordinances, the attachment of running expenses, or an order of the Royal Ministry shall constitute a forfeiture of rights. In such an event the city must pay the stockholders the value of the undertaking.

After three years the companies must pay for the use of the streets, 2 per cent. of the gross receipts. This amount is to be increased 1 per cent. after the lapse of five years, until 5 per cent. is reached. Paving and repairing the streets where new tracks are laid, and where the running of cars is responsible for the wear of the pavements, must be paid for by the companies. Despite the restrictions, the company called "The Blue Line" has paid dividends since 1896 of from 5½ to 6 per cent. each year. "The Red Line" has paid dividends of from 2 to 4 per cent. per year.

An over-head trolley is used, and the trolley wires are suspended by wires fastened to the houses on either side of the street, and the two lines together own over 131 miles of track. The larger, or "Blue Line," has 275 motor cars, 112 closed and thirty open trailers. "The Red Line" has 130 motor cars, twenty closed and thirty open trailers. The cars of the larger line are equipped with Westinghouse air brakes. The cars are lighted by electricity, but are not heated, even in winter. Automatic signal boxes are used at crossings to denote the approach of other cars. Cars are run from five o'clock in the morning until midnight at from four to fifteen minutes headway. City ordinances restrict the speed to nine miles an hour in the business sections, and with trailers, to 7.2 miles; in the suburbs, to twelve or fifteen miles, with trailers. Cars are stopped for passengers about every 250 yards, and guide posts mark the stations. Each car has twenty seats and when these are filled no more passengers are allowed inside. On the front and rear platforms, about fifteen persons are allowed to stand, and when the platforms and the seats inside are full, a sign "occupied" is hung on the rear of the car, and no stops are made to take on passengers until some one gets off. A single trip costs 2.38 cents, and entitles one to a free transfer. Passengers that have large bundles must pay an extra fare. The "Red Line" sells six tickets for 11.9 cents, and commutation tickets, good for twelve, six and three months, are issued by both lines. Postmen, telegraph and messenger boys are carried at the expense of the Government; more than seven may not ride at once on the same car. City employees, to the number of two, in uniform, may ride on the front platform free of charge, and a large number of annual passes are given to the city officials. School children under fifteen have special cards, good during certain hours, and on lines running between their homes and the school. In 1892 the "Blue Line" carried 45,007,637 passengers, and the receipts were 2.24 cents per passenger and 7.02 per car per kilometer. The cars on the "Red Line" carried 18,160,928 passengers, and the receipts were 2.16 cents per passenger and 6.23 cents per car per kilometer. Conductors are paid $20 per month the first year and the same sum is received by motormen during the first six weeks. After this both are paid from $21.42 to $28.52 per month, according to the time they have been employed. The men are given one

day off in every six, seven or eight days, according to the number of hours they work—a working day is from ten to twelve hours.

The streets are cleaned and sprinkled by the city, for which the companies pay as follows:

Streets paved with asphalt, granite, macadam and wood, 0.7 cents, 0.6 cents, 0.2 cents, 0.7 cents per square meter per month respectively, and in addition 5 per cent. for supervision of the work. In 1892 this cost the "Blue Line" $18,187.25, and the "Red Line" $11,581.97. The paving and repairing of the streets is done by contract, and the "Blue Line" last year paid over $57,000 for this purpose, and the "Red Line" $32,900; 5 per cent. of the contract price is paid the city for the superintending of the work. During the winter the companies must keep their tracks clear of snow, and the "Blue Line" has fifteen and the "Red Line" six snow-ploughs. The snow is piled on either side of the tracks, and is carted away by the city. It is charged to the companies from 43 to 65 cents per wagon load of 72 cubic feet each; the price depends upon the length of the haul.

Sick, accident, life insurance and assurity funds are established for employees whose wages do not exceed $476 per annum. These are charged to the expense account, as is also the cost of the employees' uniforms, each man receiving one uniform, two caps, an overcoat, etc., per year, except those who are working for the first year, when ten pfennigs per day is deducted for the uniform.

Richmond Regulates Placing of Electric Wires in Streets

AN ordinance has been passed by the council of Richmond, Va., providing for the granting to companies of permission to erect poles and run wires on the streets of the city and to construct conduits or subways for the purpose of supplying light and power by electricity. No special company is named in the ordinance, but it is to apply to all companies to which franchises may be granted. Some of the provisions are as follows: All conduits must be built with a capacity 30 per cent. larger than needed for the company's wires. The committee on streets is to approve of the routes chosen by the company and the work must be done in a manner satisfactory to the city engineer. Franchises shall run for thirty years and then the plant and property of the company shall become the property of the city upon the payment of a fair valuation of the same, but nothing is to be allowed for the franchise value. If the company and city cannot agree on a valuation, within six months after lapse of the franchise or within thirty days of its forfeiture, the matter must be submitted to arbitration, the arbitrators being chosen, one by the city, one by the company and the third by the Court of Hustings.

The city reserves the right to impose reasonable regulations on the company and to pass ordinances to secure reasonable rates and efficient service from the company and to compel the maintaining of the company's property in good order. It also reserves the right to charge a reasonable sum annually for the use of the streets or it may impose a tax on the poles, wires or conduits and a tax on gross receipts or a license tax. Failure to comply with provisions of this ordinance or future regulations shall cause forfeiture of the franchise. A fine of from $10 to $100 may be imposed for violations of any provision of this ordinance.

The company laying its wires must use such methods as will prevent electrolysis to the water and gas pipes and shall pay to the city damages from such electrolysis that may occur and save the city harmless for any or all damages that may arise from electrolysis or from the construction or maintainance of the said conduits or poles. All electrical work must be installed and maintained in a manner satisfactory to the city electrician.

In the power station of the company must be placed a gong to be connected with the fire alarm system so that, when deemed necessary, it may be sounded for the purpose of signaling for the cutting off of the current in any specific direction. The current must be kept off the circuit until the company is notified to turn it on again by the fire-alarm officials.

In case the council decides to grant a franchise for any public service utility, the ordinance embodying the same shall be published and shall invite bids for the franchise.

Statistics of Arc Lighting in United States Cities and Towns

	Population, 1900.	No. lamps.	Watts at lamp terminals. Open.	Watts at lamp terminals. Closed.	Schedule.	Hours burn per year.	Coal, per ton	Contract price per lamp per year.
NORTH DAKOTA								
Bismarck	3,319	...	6	...	(1)	4,000	$1.50	$120.00
Casselton	1,207	16	...	480	(3)	1,825	...	z
Fargo	9,589	67	...	480	(1)	4,000	5.25	120.00
Grafton	2,378	17	3	340	(2)(3)	1,220	6.00	z
Grand Forks	7,652	84	...	480	(2)	3,000	5.40	z61.00
Jamestown	2,853	15	...	480	(3)	1,500	2.50	76.00
Valley City	2,446	...	15	...	550 (2)(3)	1,000	3.50	75.00
Wahpeton	2,228	2	...	...	(4)	1,980	4.50	120.00
OHIO								
Ada	2,576	35	...	480	(2)(4)	1,550	1.80	58.80
Ashtabula	12,949	92	30	480	430 (2)	2,179	2.05	60.00
Athens	3,066	...	38	...	(3)	2,190	Gas	70.00
Barnesville	3,721	32	...	480	(2)	2,800	1.20	75.00
Bedford	1,486	24	...	340	(4)	1,980	1.95	65.00
Bellaire	9,912	...	100	...	(1)	4,000	1.05	60.00
Bellville	1,039	13	...	480	(3)	1,825	1.65	72.00
Bellevue	4,101	30	...	480	(2)	2,179	2.00	83.33
Blanchester	1,788	32	8	480	430 (2)(3)	2,200	2.30	45.00
Bridgeport	3,963	...	66	...	(1)	4,000	1.00	87.50
Bryan	3,131	66	...	480	(2)	3,000	2.50	z
Bucyrus	6,560	95	...	480	(2)	2,600	2.55	100.00
Cadiz	1,755	40	...	480	(2)	2,179	1.00	70.00
Caldwell	927	23	...	480	(2)	1,800	1.50	z
Canton	30,667	262	...	480	... 54(1) 208(2)	....	1.08	82.50 52.50
Cardington	1,354	40	...	480	... (3)	2,000	2.00	65.00
Chardon	1,360	31	1	480	... (2)	2,179	1.85	40.00
Chillicothe	12,976	178	...	340	... (1)	4,000	...	65.00
Cincinnati	325,902	3,393	...	...	... (1)	4,000	1.65	84.90
Circleville	6,991	121	...	340	... .	2,800	1.25	75.00
Clyde	2,515	52	...	480	... (3)	1,500	2.35	z
		810	...	480	... .	2,696	1.75	74.50
Columbus	125,560	...	53	...	480	2,696	1.90	73.00
Columbus Grove	1,935	29	...	480	... 27(2)(3)	2,000	1.40	72.00
					2(1)	4,000	1.40	84.00
Conneaut	7,133	69	...	340	... (2)	2,179	2.13	z
Covington	1,791	34	...	480	... (2)	2,179	...	69.00
Cuyahoga Falls	3,186	35	30	...	... (2)(3)	1,220	2.10	z
Dayton	85,333	...	500	...	480 (1)	4,000	...	68.50
Defiance	7,579	...	95	...	480 (1)	4,000	2.50	75.00
De Graff	1,150	29	...	480	... (3)	1,825	2.26	z
Delaware	7,940	125	...	480	... (1)	4,000	1.10	82.00
Delphos	4,517	51	...	480	... (4)	1,930	2.45	82.00
Dennison	3,763	100	...	480	... (1)	4,000	.75	70.00
E. Liverpool	16,485	...	109	...	430 (1)	4,000	1.60	76.00
Findlay	17,613	178	...	480	... (1)	3,650	1.30	69.50
Fostoria	7,730	120	...	480	... (1)	3,650	1.96	90.00
Fremont	8,439	78	...	480	... (1)	4,000	1.90	75.00
Galion	7,282	103	...	480	... (2)	2,547	2.21	z
Geneva	2,342	...	45	...	... (2)(3)	1,500	1.95	65.00
Greenville	5,501	91	...	480	... .	3,480	2.65	84.50
Greenwich	849	26	...	480	... (2)	2,179	2.75	z
Hicksville	2,520	21	...	480	... (2)(4)	1,550	1.35	65.00
Hillsboro	4,535	69	...	480	... (2)	2,179	1.45	87.50
Huron	1,708	...	46	...	... (3)	2,000	1.95	z32.00
Jamestown	1,205	23	...	340	... .	3,500	1.95	55.00
Jackson	4,672	84	...	480	... (2)	2,179	1.55	z34.00
Kenton	6,852	110	...	480	... (1)	3,800	2.25	75.00
Lancaster	8,991	107	...	480	... (1)	4,000	Gas	85.00
Lebanon	2,867	...	69	...	... (2)	2,179	2.25	z45.00
London	3,511	71	...	480	... (2)	2,179	1.70	40.00
Londonville	1,581	47	...	340	... (2)(3)	1,220	1.00	z
Lorain	16,028	...	112	...	... (1)	3,760	(6)	87.00
Lakewood	3,355	...	103	...	430 (2)	3,150	1.85	z
Lima	21,723	...	180	...	430 (1)	4,015	2.00	85.00
Lisbon	3,330	43	...	340	... (1)	4,000	1.30	40.70 3.60
Martins Ferry	7,760	106	...	480	... (2)	3,400	.70	z
Marion	11,862	181	...	480	... (1)	4,000	1.55	83.00
Maumee	1,856	...	26	...	430 (1)	4,000	W. P.	70.00
Medina	2,232	...	30	...	550 (4)	1,980	1.50	66.00
Mansfield	17,640	156	...	480	... (1)	3,650	1.85	100.00
Marysville	3,048	52	...	480	... (4)	1,640	1.75	77.50
McConnellsville	1,825	47	...	375	... (2)(3)	1,750	1.70	50.00
Middletown	9,215	120	12	340	430 (1)	4,000	2.00	84.00
Millersburg	1,998	40	...	...	... .	1,545	1.50	60.00
Montpelier	1,869	35	...	480	... (2)(3)	1,220	1.55	z
Mt. Vernon	6,633	101	...	480	... (2)	2,179	1.20	68.00
Napoleon	3,639	43	...	480	... .	2,534	2.45	z
Nelsonville	5,421	50	...	340	... (2)	2,200	1.00	72.00
New Philadelphia	6,213	89	...	480	... (2)	2,179	1.00	75.00
New Richmond	1,916	...	40	...	430 (3)	2,000	1.67	40.00
Norwalk	7,074	103	...	480	... (3)	2,190	1.50	70.00
Oak Harbor	1,631	23	...	480	... (2)(3)	1,220	2.10	50.00
Oberlin	4,082	50	...	480	... (2)	1,500	2.50	50.00
Oxford	2,009	41	...	480	... (3)	1,825	2.65	z
Painesville	5,024	95	...	480	... (2)(4)	2,000	2.15	z
Plain City	1,432	34	...	480	... (2)(3)	1,220	2.10	z
Pomeroy	4,639	...	35	...	430 (2)	2,200	.63	80.00
Port Clinton	2,450	22	4	480	430 (1)	4,000	2.00	65.00
Ravenna	4,003	60	...	480	... (2)	2,150	1.90	72.50
Sabina	1,481	...	43	...	340 (2)(3)	2,000	2.85	55.00
Salem	7,582	163	2	340	... .	2,600	1.70	70.00
Sandusky	19,664	165	...	480	... (1)	3,800	2.00	87.50

(1) All night. (2) Moonlight. (3) Midnight. (4) After midnight up to 1 or 2 A. M. The difference in time may be judged from the column showing number of hours lamps burn. (6) Rent power. (8) Sawdust. z Municipal plant.

The data given in the above table were collected by the General Electric Company, Schenectady, N. Y.

(To be continued.)

FIREPROOFED WOOD FOR BUILDING

"Fireproofed" vs. "Fire-Resistant" Wood—Tests Applied in New York and the Advantages Secured—Rapid Progress Being Made in Building Construction

*By Prof. Ira. H. Woolson**

In the construction of large buildings, the question of fireproofness has at last assumed its proper position at the head of all other questions concerning the manner of construction.

As representatives of this twentieth century, we congratulate ourselves upon our advanced civilization, and our industrial and scientific development, but it is a lamentable fact that numerous problems of vital importance to the life and happiness of our race are still unsolved through stupid neglect.

Two of these problems are fireproof construction and sanitary regulation of disease. There is little cause for complaisancy over these subjects when contrasting the world's condition to-day with that of two or three centuries ago.

Fortunately we are at last waking to the gravity of the situation, and material advancement has been made in the past decade. It has taken us 2,000 years to learn that great conflagrations are the result of human neglect and ignorance, rather than visitations of Divine wrath. The same is true of widespread plagues and distributed malignant diseases.

"Fireproof" Often a Delusion

We have made marvellous progress during the past few hundred years in the method and magnitude of our building operations. The introduction of iron and steel into this class of construction marked an era in architectural history. With their advent came the use of the term, "fireproof construction." It was fancied that steel beams, iron columns, and tile or concrete floors would make a building indestructable. Alas! we know to our sorrow that the term "fireproof" is often a delusion. Buildings, as generally constructed during the past twenty-five years, were no barrier to fires, and, as a matter of fact, not so safe as if built of solid wooden beams. These would at least be slow-burning, and not wreck the whole building by the buckling of columns and beams as soon as heated.

Our cities are filled with magnificent structures, marvellously constructed, but a very small percentage of them are at all fireproof. It is absolutely true that our great cities to-day are but little less inflammable than they were in 1666, when this city (London) was swept by fire from Tower to the Temple, with results sufficiently awful to make a period in history. Similar conflagrations have occurred with painful frequency all over the world since that time, and now, after a lapse of 250 years, are still of yearly occurrence. Were it not for the high efficiency attained by the noble body of men, the firemen, in all our cities, consequences of fire would be far more appalling than they are. This is particularly true in America, where the craze for high buildings has made the fireman's work doubly hazardous.

The time has come when all permanent construction should be strictly incombustible. That the public has awakened to this fact is evidenced by this gathering of representative men from all parts of the world to discuss the various methods of solving the problem.

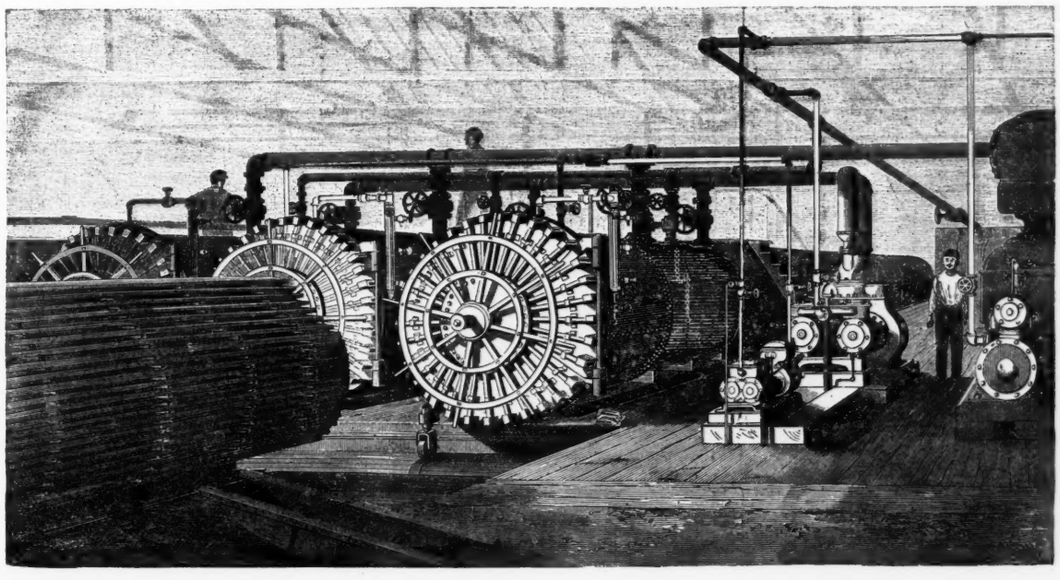
The necessity of *fire prevention* is beginning to be appreciated. Energy and money are freely spent in exploiting all kinds of fireproof construction. Fortunately the public has lost its credulity, and no longer accepts the statement that a system of construction is fireproot unless it is *proven* to be such by practical test.

In the United States during the past few years, much investigation of this character has been done by the New York City authorities, also by the National Board of Underwriters at their testing laboratory in Chicago, and by the Insurance Engineering Experiment Station in Boston. All are doing excellent work. I am informed that much similar work is being accomplished by experts in various continental cities. I regret that I have been unable to secure records of their work.

If this class of investigation receives the support it deserves, the results will be invaluable, and reduce to a minimum the fire hazard of large buildings. Among the various materials for reducing fire risk is the so-called "fireproof wood." It is upon this subject your executive has kindly requested me to address you to-day,

"Fireproof Wood"

First of all, let us have a clear understanding of what is meant by the term "fireproof wood." For the information of those un-



CYLINDERS IN PLANT OF AMERICAN WOOD FIREPROOFING COMPANY AT NEWARK, N. J.

* Of Columbia University, New York, who read this paper before the International Fire Prevention Congress, held in London, Eng., July 6-11, 1903.

familiar with the subject, it should be stated that the term "fireproof wood" is a misnomer; for all such woods will burn if exposed for a sufficient time to a high degree of heat. Strictly speaking the processes of treatment do not make the woods *fireproof*, but simply render them fire retardants. Fire-resistant wood is a much more logical term. The public has been somewhat deceived by the representatives of certain processes who make the silly claim that wood treated by their methods are rendered absolutely incombustible. Such statements are foolish, for they lead to expectations of resistance which cannot be achieved. When the deception is discovered it causes unjust criticism and mistrust of the whole product.

The term "fireproof wood" is a trade name, and should not be taken in a strictly technical sense.

New York City is probably now using more fire-resisting wood than any city in the world. This results from two causes: First, the Building Law, which requires that such treated wood shall be used throughout all buildings over twelve stories (or 150 feet in height); and secondly, to the fact that the city proper is too limited in area to spread, and enormously high buildings have become necessary. Scores of buildings erected during the past two or three years are over fifteen stories high, and many of them twenty-five and thirty.

It has been my privilege, under the direction of the Bureau of Buildings, to test most of the wood which has been used in these buildings. For the year ending the first of this month, I have tested and reported upon upwards of 3,500,000 feet. The greatest part of this material was for floors, which were laid on the top of strictly fireproof floor construction of the concrete or hollow tile. The balance of the material was used for trim. An evidence of the magnitude of building construction now going on in that city, is the recent filing of plans with the Bureau of Buildings for one structure in which 2,000,000 feet of fireproofed wood will be required.

There are at present three companies supplying this treated wood to the city: The American Wood Fireproofing Company, the Fireproofine Manufacturing Company, and the Electric Fireproofing Company. Most of the wood used in the city the past year has been supplied by the first two mentioned companies, and my tests have been largely confined to their product, although I have from time to time tested wood treated by the Electric Company, and by other companies seeking the approval of the Building Bureau.

The impregnation of wood with chemicals to render it fire-resistant is by no means a new idea. Numerous experiments with various chemicals were made as early as 1825 by Fuchs, Gay-Lussac, Boucherie, and later by Löchtin and other continental chemists. However, it is within the last few years only that the business has been put upon a practical commercial basis.

NEW YORK GREATEST USER OF FIRE-RESISTING WOOD

In America, the work is mostly confined to New York City, where the three companies already mentioned are in operation. There is a branch of the Electric Fireproofing Company located in Montreal, while the Standard and Farrell Wood Fireproofing Companies are situated in Philadelphia.

On this side of the water I understand there are extensive works in operation in France and Germany.

It is conceded, by most experts who have carefully studied the subject, that the fireproofing of wood is a safeguard, and under ordinary conditions, will greatly reduce the fire risk. It will, however, be consumed by continued application of flame, and under certain conditions especially favorable to fire, may support a slow combustion by itself, but the same conditions of heat would also ruin many other accepted fireproof materials. To my mind, the non-inflammable nature of the material is its greatest value.

When a fire occurs in a room trimmed with ordinary wood, its inflammability makes it immediately dangerous. The flames leap from one point to another, dashing through windows and transoms, thus spreading the fire to adjoining rooms. If the wood is finished with oil or varnish, the flames will run along it with marvellous speed. If finished with well-treated wood this tendency of spreading the flames is reduced to a minimum, even if the burning material in the room is sufficient to ignite the treated wood, it burns so slowly that life and property are much less menaced. It would at the worst be a distinctly slow-burning conflagration. That in itself is a great safeguard, because it allows time for the arrival of the firemen.

Numerous inorganic materials are being exploited to replace wood entirely in fireproof construction. If it were possible to find a substitute for wood, which possessed its merits and none of its failings, it would be most desirable. So far, I have never seen anything which had the lightness, strength, durability, cheapness, ease of working, and last but not least, the elements of beauty for decorative purposes which wood possesses. For these reasons it will surely long remain a favorite with architects.

Granting the value of fire-resistant wood as a structural material, the next problem is to determine what degree of fireproofness should be exacted, and how the standard of quality can be maintained.

Not being acquainted with the methods employed on this side to accomplish these objects, I will confine my remarks to our practice in New York.

(*To be concluded in December*)

COST OF OPERATING DIFFERENT KINDS OF ENGINES

AN interesting comparison between horse-drawn fire-engines and automobiles was made by the authorities of Hanover, Germany, showing the comparative rapidity, efficiency and cost of both kinds. To carry out the scheme the following purchases were made:

1. Three horse-drawn hand fire-engines, costing altogether $11,067.

2. A fire-engine with motor for working the pumps, electrically propelled, and costing $3,641. Empty it weighed 5,482.4 pounds and with load, 10,095.8 pounds. The battery of the machine weighed 2,442 pounds, the water 880 pounds, accessories, 468.6, and the five men it carried, 822.8. The electric motor was capable of a speed of 9.92 miles per hour, using 1.29 kilowatt hours per mile at 6.61 amperes and 121 volts. The machine will run fifteen and one-half miles.

3. An electric reservoir carriage costing $2,517.50 was purchased. This weighed 5,022.6 pounds empty, and with load 10,093.6, with a speed radius greater than for the preceding.

4. A steam fire-engine was the last machine to be purchased. It cost $2,522.8 without accessories, weighed empty 7,568 pounds, 9,955 pounds full, the water, alcohol and coal weighing 1,047.2, the outfit 286 pounds, and six men 1,053.8 pounds. It had a speed of 12.4 miles an hour and a delivery of 264.2 gallons a minute. The boiler had a heating surface of 60,568 square feet and a fire-bar surface of 4.09 square feet. The pump mechanism consisted of two double-acting cylinders having 10 horse-power and were placed between the pump and the boiler. A ring of gas at the fire station kept the boiler under steam. The engine was started by liquid carbonic acid gas and the fire lighted with briquettes saturated with alcohol. Coal or coke was afterwards used. Only rain water was used in the boiler.

The last three machines were odorless, noiseless and smokeless and the wheels were rubber-tired. These tires were guaranteed to run 6,200 miles, which was equivalent, with the average run, to five years' service. The fuel for the engines and the electric current for the other machines cost about $477.

A comparison was made both in regard to the purchase price and the cost of working. The three automobiles cost $10,091, which with $2,998.80 for accessories, aggregated $13,090, while the cost of the horse-drawn hand-engines amounted to $11,067. This left a balance in favor of the latter of $2,023. The expenses for the year for working the automobiles amounted to $5,950, while the hand-engines cost $8,687, leaving a difference of $2,737 in favor of the mechanical pumps.

Methods of Fire Protection

A DISCUSSION of the questions of the methods for fire protection already devised and of their practical application in building, was the subject of a paper by Mr. Horace Porter, before the Royal Institute of British Architects. Mr. Porter stated at the outset that fires due to mechanical or structural causes were the only ones that could be prevented. These should be considered carefully because they could be largely guarded against. Before the introduction of the Buildings Regulation Act in Glasgow in 1876, the number of fires due to defective flues, etc., amounted to 27.8, while in London these were only 9.65 per cent. of the total. All possible care should be insisted on in the building and repair of chimneys and flues, and all unused fireplaces and the chimney top as well should be walled up with non-combustible material.

As fire-prevention is only possible, according to Mr. Porter, in 25 per cent. of fires, attention should be given to fire-resistance. The two chief elements in fire-resisting construction are: (1) The materials used; and (2) the general design of the building and details of construction.

Mr. Porter considers brickwork the best for fire-resistance, but the chemical composition of the clay is the great element in determining the fire-resisting and weight-carrying properties of the brick and depends on the proportions of silica and alumina and also on the oxide of iron, lime, etc. Porous terra cotta is non-conductive of heat, but is not so strong as the solid. The solid depends on the hollow spaces left in moulding and is liable to crack when suddenly cooled. The porous form is better for the protection of girders where there is little weight to be carried. Concrete floors, after tests, showed that they might hang together under heavy loads, but became weakened. Cement mortar could not be relied upon to resist high temperatures. Common lime and sand mortar in small quantities seemed to have the greatest fire-resisting properties of any plastic material and would be a better protection than cement mortar if strong enough to be used to a thickness of four inches or more. Tests of concrete showed that, when made of sand, gravel or stone, it crumbled under sudden cooling, but if composed of one part of cement to seven of coarse cinders, wetting when hot had no effect. Wrought and cast iron and steel must be cased in some fire-proofing, but its expansion might cause great damage to the building. Mr. Porter considered that combustible material should be sparingly used in building. Shelves might be made of wire supported on iron uprights, and where it was necessary to use wood, this, treated to fire-proofing, should be employed.

Design, construction and fittings are the most important questions in the problem of fire-resistance. Errors in design will cause what might have been a small fire to spread over a large area. The presence of elevator and light shafts adds directly to the danger and is a question to be carefully considered. Considering the treatment of light shafts, the use of wire-glass for skylights is desirable as it helps to prevent the fire from coming through from below or embers falling from above. It will withstand great heat and sudden cooling and is valuable for warehouse windows as well as for skylights.

Respecting staircases and elevator shafts, the author considered that their walls should be composed of fire-resisting material, with access to floors by fire-resisting doors only. The walls should be carried above the roof and be covered with wire-glass. A system of automatic sprinklers about a shaft might be arranged so as to check a rush of flame up the shaft. This should be placed just under the roof and perforated pipes might be connected with an outside standpipe. The author considered a staircase of oak or hard wood would be most reliable. Large areas should be subdivided by fire-proof walls.

Experimental tests have shown that hollow tile arches of good design and not too long span, have a strength equal to any load that would be placed on them. They are satisfactory as a fire-resistant, although liable to crack under sudden cooling. For columns and girders a fire-resistant should be a non-conductor of heat, should withstand action of fire and water and not break away from the column and should not have joints for the fire to get through. Metal lath should be used where plaster is used for the covering and the column should be first wrapped with asbestos bound with wire. The author considered it important that terra cotta partitions should start directly on the floor masonry and should be of sufficient width to secure stability. Great care should be taken to protect all openings in floors and walls through which steam, gas or other pipes and wires passed. While fire-proofing involved considerable expense in construction and caused a sacrifice of space and artistic effect, architects should study the problem how best to secure this protection and still obtain the best effects.

A New Automobile Fire Engine

THE automobile has been rapidly coming into favor all over the world, but thus far the greatest advance has been made in Europe, where good roads invite the use of these machines for touring. The use of the automobile has not been confined to pleasure seekers, but good use is being made of the machines in city business. The fire departments, especially, have been taking it up and steam and chemical engines automatically propelled have been successfully used for some time. A new style of automobile fire engine has been built by a manufacturing concern of Frankfort, Germany, and is shown in the accompanying cut. The machine carries four men and can be propelled by three men, should the power give out. A speed of eleven miles an hour can be attained and will be used to render first aid in case of fires. The small detachment of men will be able to reach a fire in quicker time than the heavier apparatus and can do much in the way of life saving or fire extinguishing.

AUTOMOBILE FOR GERMAN FIREMEN

New Regulations for Savannah Fire Department

AN ordinance providing for the better efficiency of the fire department of Savannah, Ga., was recently passed by the Council of that city. The ordinance provides that the department shall consist of a superintendent, assistant superintendent, superintendent of fire alarm telegraph, eight firemen, eight assistant firemen, six engineers, six assistant engineers, fifty-five regular firemen and four supernumeraries. The superintendent of the fire department is to be elected by the Council every two years, while the assistant superintendent and every other member of the department is to be appointed by the mayor upon the recommendation of the superintendent of the department, approved by the committee on fire of the Council. No one except the superintendent, assistant clerk and electrician shall be a member of the department until he has met certain requirements. He must be a citizen of the United States, have lived in Savannah for at least one year before his application, must not be less than five feet six inches high, nor weigh less than 135 pounds, and he must be between the ages of twenty-one and thirty-five. He must pass a satisfactory physical examination and be free from any constitutional disease or other defects, such as deafness, impaired vision, etc.

The salary of the superintendent of the department is to be $2,000 per year, and his bond shall be placed at $3,000; the assistant superintendent's salary is to be $1,500 per year, with a bond of $1,500; the salary of the clerk is to be $900 per year, with a bond of $500; the salary of the electrician is to be $1,200 per year, with a bond of $500; the salaries of firemen are to be $840 each per year, with bonds of $500; of the assistant firemen, $720 per year, with bonds of $200; of the engineers, $1,000 per year, with bonds of $500; of the assistant engineers, $720 per year, with bonds of $200; the regular firemen shall be paid at the rate of $50 per month the first year, $55 per month the second year and $60 per month for every year thereafter; the supernumerary firemen are to be paid $50 per month for the actual hours of service; the bonds both of regulars and supernumeraries are to be placed at $100 each.

The mayor shall have power to discharge any member of the department, except the superintendent, with or without assigning a cause. Such members as shall be found guilty of violation of the rules or ordinances shall be subject to a fine of from $1 to $100, or may be discharged from the service or reduced in rank or pay, at the discretion of the mayor.

The superintendent of the department is to have the power to establish such rules and regulations as may be necessary, subject to the approval of the committee on fire. He must report daily to the mayor the condition of the houses, apparatus, and property of the department.

After a continuous service of twenty years or more, any member of the department who is permanently injured, physically or mentally so as to be unfit for duty, may be placed upon the retired list, and receive an annual pension equal to one-third of his full salary when he retired. After serving thirty years, each member that is permanently disabled, physically or mentally, so as to be unfit for duty, is to be retired on a pension of one-half the full salary he received. When any member dies in service of natural causes, he is to be buried by the city, and his family is to receive his monthly salary for three months; if such member should die from injuries received in the discharge of his duty, the family is to receive his salary for six months.

The superintendent, or his assistant, is to have the power to pull down, or blow up, any house or other building, which he may consider necessary to be pulled down, or blown up, to prevent the further spread of fire. Any officer or member of the department can have the authority to enter any house to search for quantities of powder, chemicals, explosives, turpentine, oils or any inflammable material that may be exposed to danger from fire, and may direct the owner of the premises to remove all such materials within twenty-four hours, or take such precautions as the superintendent of the department may direct. In case the order is not complied with, the superintendent shall inform the mayor, who shall cause such material to be moved at the expense of the owner. Firemen shall also have the power to examine into the condition of any chimney, fireplace or smokestack and, if the same be found to be dangerous, he may direct the owner to take such precautions as are necessary. In addition to these powers, the usual regulations are included with respect to the use and abuse of signal box keys, giving of false alarms, and the interfering with firemen in the discharge of their duties.

San Antonio's Excellent Department

A FIRE insurance underwriter recently said of San Antonio, Tex., according to a local newspaper: "I want to say that San Antonio has the best fire department in the State of Texas and that her chief, W. G. Tobin, has no superior anywhere. I am not alone in this opinion, but the entire membership of the State Fire Underwriters' Association will back me up in what I say, for we saw that department work a few days ago and know just what we are talking about.

"The department is paid and there are men enough to handle a fire properly. They are properly officered, subject to strict discipline and are constantly drilled. They have a drill every day. Sometimes they are merely taken out for a run, so that they may become perfect in riding the apparatus, controlling the horses and getting into their slickers en route. The next day they are perhaps taken to a large building and given a drill at saving life, while the third day they are perhaps put through all the evolutions that they would have to perform if a fire was actually in progress. They are kept busy all the time and are never given less than three or four drills a week.

"The department is thoroughly equipped, having six engines, eight hose wagons, two of them combination chemical engines, one ladder, one chemical engine, and one supply wagon, the latter equipped with extra supplies of fuel, chemicals, etc.

"When an exhibition was given for our benefit the department had a run of three blocks through the busiest section of the city, on paved streets, around two corners, and after the alarm was turned in it was only a minute and eighteen seconds till there was one stream of water being thrown from a hose and in exactly two and a half minutes the hook and ladder had been raised into a five-story building, a double-nozzled hose taken up, an engine connected with it and a stream of water was being thrown. By this time the apparatus from other parts of the city had arrived and before three minutes had expired from the time the alarm was given there were seven streams of water on the building, the roof was covered with men and the ladders had been run up in the windows in the front of the building, by which means the men were enabled to enter any of the six stories without interfering with the ladder from the main truck, which assisted the men to the roof, a man had already jumped into the life saving net and several were being lowered from the fourth and fifth stories.

"The city gets as good insurance rates as we can possibly give it, and it is all because of the efficiency of the department. If other cities would follow the example of San Antonio and pay more attention to their fire departments it would mean a big saving to the business interests on insurance rates. Money spent on a good fire department is an excellent investment. San Antonians take a pride in their department and will never stand for reductions, but on the contrary always back the chief in every request for improvements."

Police Force of Manila

THE police department at Manila, P. I., has done wonders in the restoration of order in that far away city. The police force was organized when the civil administration was restored some two years ago. It is composed of a chief, assistant chief, instructor, assistant instructor, six captains, six lieutenants, and about 800 patrolmen—equally divided between Americans and natives. The city was divided into six precincts, each placed under the command of a captain. When first installed, the officers were supplied with both rifles and revolvers, but when order had been restored, it was found possible to reduce the force to about five hundred, and clubs took the place of the rifles. At present the men work for eight hours each day, and the officers all sleep at the station house. A great part of the American contingent in the department is composed of honorably discharged soldiers from the American army.

The pay of the captains amounts to $2,000 per year; lieutenants receive $125 per month; sergeants, $110; roundsmen, $90; patrolmen, $75. The jurisdiction of the police force extends outside of the city of Manila a distance of five miles on land and three miles on the water, and, in addition to attending to the disorderly element in the city, the force is often called upon to aid the Philippine constabulary. The native and Spanish officers are gradually being instilled with the American spirit, and are being depended upon more and more to take charge of important cases.

J. E. Harding, former adjutant of the 35th Volunteer Infantry, is the present chief of the police force, and he considers that there is not a city of a similar size in the United States where better order is preserved. The Fourth Precinct is known as the "Tenderloin" and is outside of the walled city. This section was one of the most disorderly of any in the city before the establishment of the police force, but is now in as satisfactory a condition as any similar section in any other city.

In addition to the police department there is a bureau of detectives, consisting of a chief, assistant chief and about thirty men.

Outside the city of Manila the policing of the islands is entrusted to the Philippine constabulary, under command of Captain Allen of the regular army. The members of the force are all Filipinos; they are armed with rifles and revolvers.

WHAT POLICE AND FIREMEN ARE DOING

Wireless Fire Alarm—Firemen's Unions—Three Firemen's Associations Meet—New Smoke Mask—Dresden Police Have Large Powers

Automatic Wireless Fire Alarm

In the new fire alarm system of Emile Guarini, of Brussels, automatic signals are sent to the engine house by wireless telegraphy. The raise of the mercury in a thermometer acts upon a relay and sets in motion a wheel which makes and breaks the electric circuit by a series of contacts. A series of impulses is thus sent through an induction coil and the usual transmitting apparatus. The receiver at the central station, or engine house, includes air and earth conductors, coherer-battery and Morse instrument. The same receiver can serve a number of transmitters in different places, and as the contacts on the wheel can be varied the exact location of the fire can be indicated.

Unions Among Firemen

The introduction of the labor union idea among the firemen of Pittsburg, Pa., has resulted in a secret organization, and a charter is to be granted by the American Federation of Labor. The organization, it is claimed, consists of 550 members, and it is proposed to unionize the department of Allegheny also. While the firemen of Pittsburg have just entered the union ranks, those of Washington, D. C., which were affiliated with the Central Labor Union, have withdrawn from the union ranks, and their union is now defunct. The American Federation of Labor tried to obtain a twelve-hour day for the firemen, but the Commissioners of the District reported that it was not feasible. The men accepted the decision of the Commissioners, because they did not wish to clash with their superiors, and, as the American Federation of Labor offered them nothing further, the members of the local union disbanded.

Scranton, Pa., firemen began a movement for an increase of wages, but this was unsuccessful; as a result, a union was organized which affiliated with the American Federation of Labor. The purpose of the union is to improve the general condition of the firemen, and it is probable that the walking delegate will soon have charge of the department in place of the chief.

Police Must Not Accept Rewards

The Board of Police Commissioners of Newark, N. J., has decided that the members of the force must not be permitted to receive rewards from citizens for the recovery of stolen property. It was stated that this rule would assist in retaining respect for the department and those that wished to express their appreciation of any act of the police could do so by contributing to the pension fund of the department which would benefit all the members.

New French Smoke Mask

A member of the fire department of Paris, France, has invented a smoke mask for use in smoke and gas-filled rooms. A mask is attached to the helmet by means of straps. Mica covered openings permit the wearer to see and these are covered with wire to protect them from injury. On his back the fireman carries an air reservoir from which a copper tube leads to his mouth, supplying the good air. A second tube is used to emit the foul air. While the air is under considerable pressure in the reservoir it is so arranged that the man breathes it at normal pressure so that breathing is not a difficult matter. The ears are not covered. When the air supply is getting low a small bell warns the man that it is time to seek a better atmosphere and have the reservoir recharged. The need of a good, practical mask by the aid of which firemen may fight flames at close quarters despite the smoke is felt in all departments and the Parisian fire department officials hope that this new invention will be found to be what is wanted.

Want to Be Paid Weekly

The employees of the Waterbury, Conn., fire depratment recently presented a petition to the Board of Public Safety asking that the men receive their pay once a week instead of every two weeks. If the request is granted by the board it is probable that the police and other city employees will ask for similar privileges. The plan of weekly payment for employees of all departments has been under consideration for some time. The men claim that a weekly payment of the salaries will permit of their purchasing necessities on a cash basis and obviate their asking credit from dealers.

Fire Department of South Bend

The history of the present fire department of South Bend, Ind., dates back to 1885 when the nucleus was formed by the council. Previous to that date the fire-fighting was done by volunteer companies. At present the department is composed of forty-four men and twenty horses. There are six hose wagons in as many stations, a chemical engine, a fine hook and ladder outfit, a reserve truck and a reserve hose wagon. Each company is supplied with ladders, 2,000 feet of hose and large Babcock fire extinguishers. The truck is equipped with a life net. Chief Wilfred Grant and Assistant Chief William Smith are in charge of the department and are veteran firemen.

Fire Equipment in Newark

The report of the fire department of Newark, N. J., shows that there are 246 men in the department, including Chief Robert Kierstead, a deputy chief, two battalion chiefs and 167 firemen. There are in service sixteen fire engines, two chemical engines seven hose wagons and ten combination chemical engines and hose wagons, fire trucks, a water tower and nineteen exercise wagons. In reserve are held six engines, a truck, a chemical engine and an exercise wagon. The horses number 104 and there are 37,800 feet of cotton hose, and 550 feet of rubber hose and 1,000 feet of chemical hose in good condition. During the year there were 736 alarms, an increase of seventy-one over the preceding year. There were twelve seconds and six third alarms. Five engine and four new truck houses are recommended by Chief Kierstead. He also urges a fireboat to protect the water front. The pay roll of the active men amounts to $258,318.42 and of the pensioned and retired $7,241.77. The total expenses footed up $373,141 and included the purchase of four engines, two trucks and four combination chemical hose wagons.

Meeting of National Firemen

The National Fireman's Association held its sixth annual convention in Chicago on September 28th and 29th. Some two hundred delegates attended, and fifty-three new members were enrolled. In the absence of Mayor Harrison, City Attorney Taylor welcomed the delegates. President Hale and B. F. Staymates, of Clinton, Ill., responded. A committee was appointed to select a national fireman's memorial day. Ex-Chief Paige, of Joliet, Ill., read a paper on the "Civil Service in the Fire Department" in which he contrasted the two systems, civil service and merit. A heated discussion followed the paper, and "merit" men won by a large majority, the Association recommending that system. Secretary Gillen read a paper on "Firemen's Tournaments: Are They of Benefit to the Fire Service?" The subject of "Firemen's Newspapers" was handled by W. C. Campbell, of Harlem, Ia., and A. M. Dettlebach, Chief of Santa Fe, New Mexico, contributed a paper, "Why Volunteer Firemen Should Join the National Association." Assistant Chief Carroll, of Detroit, read a paper on "Should Not the Bureau of Inspection, the Erection of Fire Escapes and the Care of Fire Hydrants Be Under

the Control of the Fire Department?" Much comment was caused by this paper. Each paper was fully discussed by the delegates and proved of great benefit to all.

Despite the objection of many the convention endorsed the scheme for an international congress and national tournament at the St. Louis Exposition next year, where the annual convention of the association will be held. A committee, including President George C. Hale, Kansas City; D. W. Swingley, St. Louis; B. F. Staymates, Clinton, Ill.; D. W. Gillen, Chicago, and eleven others was appointed to take the matter in charge. Officers elected for the coming year were Ex-Chief George Hale, president; D. W. Gillen, secretary; L. E. Lookabill, Roanoke, Va., corresponding secretary; John H. Fryer, Whitewater, Wis., treasurer; B. F. Staymates, Clinton, Ill., national organizer.

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Reorganization of Memphis Fire Force

THE fire department of Memphis, Tenn., has been reorganized by the appointment of an additional assistant chief, four new captains, two engineers and twenty-seven privates. This will add an additional expense to the maintenance of the department of $33,480. John Connell was made assistant chief. The department will now have eleven engine companies, three hook and ladder companies, a chemical engine company, and a water tower. It is proposed to engage a competent drill master from some eastern city and the whole body of 180 men will be trained in fire-fighting methods. It is hoped by the authorities and citizens that this placing of the fire department on the most up-to-date footing will cause the insurance companies to lower their rates.

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Power of Dresden Police

ONE advantage accrues to the respectable member of the community from the minuteness with which the Dresden police look into the affairs of every inhabitant of the city. If he is a careful man and always carries papers which may serve to establish his identity, he is practically immune from the indignity of being arrested and marched off to the police station, unless, indeed he commits some especially heinous crime. Does he drive faster than the law permits, does he cross a bridge on the left hand side or ride his bicycle through forbidden streets, he is stopped by the guardian of law and order and requested to give his name. If he has his papers with him the policeman may then and there impose a fine of from one to three marks. If then he admits that he is in the wrong, and pays the fine the incident is closed. If, however, he wishes to appeal from the policeman's decision he may do so. Even in that case he is not arrested, but a day or two later he is notified to appear in court and answer to the charge against him. But then if he is found guilty the lowest fine that can be imposed is three marks. That this custom of permitting the policeman personally to impose small fines is little understood by foreigners is shown by a remark made to me a short time ago by a gentleman, who had lived in Germany the greater part of his life and in Dresden for a number of years. In reply to my inquiry as to whether there was ever any question of corruption in the police department, he replied:

"No; none whatever as far as the higher officers are concerned. The individual men, however, may be bribed occasionally. For instance, if I were to walk on the grass in the Grosser Garten and a policeman caught me at it, I would give him a mark or two and that would end the matter.—*Philadelphia Ledger.*

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Largest Firemen's Meet of Year

THE conventon of the Pennsylvania State Firemen's Association which was held at Allentown, Pa., October 6-7, and which was to be the largest thing of its kind was spoiled by the rain. While the sessions were held as scheduled, the large parade and other outdoor events could not take place. The delegates numbered 852, making this the largest firemens' convention of the year. Several interesting papers were presented, among which were the following topics: 1. "What Methods are Best for Carrying Hose to Prolong the Life of the Same; on a Reel or a Wagon Body?" By W. H. Long, of Hanover. 2. "The Danger of Life Attending Firemen at Work Fighting Fires from Electric Light and Trolley Wires and the Remedy," by W. H. Sarah, of Braddock. 3. "Should Not Councils in All Cities and Towns Grant to Firemen the Right of Way in Answering or Returning from an Alarm of Fire?" by J. N. Hall, of Scranton. 4. "Coverings for Mercantile Establishments," by Dr. Charles S. Martin, in which he recommended the use of rubber coverings, as they prevent fire from getting a hold, and save goods from water, smoke and chemicals. State Senator A. G. Dewalt presented a paper on the question of a law to compel private water companies to give their water free to fire companies in case of a fire.

At the fair grounds a lunch for 30,000 people had been provided but not more than 5,000 ventured to the grounds in the rain and the surplus food was divided among the Allentown companies and served to their guests in their houses. Rain also spoiled the concert of 120 massed bands that was to have been given.

A number of exhibits were given by manufacturers. Among those present were: Gamewell Fire Alarm Telegraph Company, of New York, with Mr. Fred S. Peace as representative; Diggs' Fire Extinguisher Company, of New York, represented by Mr. G. S. Riker, of Philadelphia; and the Seagrave Company of Columbus, O., with Mr. W. C. Meyer in charge.

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Convention of Pacific Coast Chiefs

THE eleventh annual convention of the Pacific Coast Association of Fire Chiefs was held at Olympia, Washington, September 22nd to 24th. There were very few absentees among the members, and considerable work was done at the business session. Councilman Price welcomed the delegates and President Kellogg, Ex-Chief of Seattle, responded. The first session was interrupted by an alarm of fire, and the visitors had an opportunity to see a real run of the local department. At the second session, a paper by Christopher Clarke, of Northampton, Mass., on "Common Sense Fire Protection" was read by Secretary Bringhurst. A committee was appointed to collect and arrange the points of value for the benefit of the association. Another alarm of fire again interrupted the session and scattered the delegates. Several of the chiefs, including Chief Poyns of Tacoma, discussed building construction at considerable length, and a resolution was adopted favoring heavy wood work for posts and girders, and iron lintels. The convention also favored Chief Poyns' suggestion that the ranges should have at least two courses of brick underneath them and sheet iron in many cases; little faith was placed in asbestos. An extended discussion was also had on the matter of elevator shafts, and Chiefs Poyns, Carlyle and Wilcox were appointed a committee to report on the best solution of the problem. City Electrician Joslyn spoke of the "Fire Hazard of Electric Transformers," which are filled with oil and highly inflammable. He recommended that they be kept away from buildings. At the fourth session, a paper by President James D. MacNeill, of the North Carolina State Association, was discussed for about two hours. President MacNeill told of the workings of the North Carolina law compelling all cities and towns to employ a fire chief for the purpose of maintaining organized fire protection.

"The Salt Water System of Boston and Its Far Reaching Consequences" was taken up in a paper from Captain William Brophy. The efficiency of wood water mains over those of cast iron was fully discussed. The convention decided that steam and hot air pipes should be better protected than is usually the case. At the last session the sprinkler system was discussed, and the convention inspected the exhibits of fire apparatus and appliances, including the Gamewell fire alarm telegraph system. The efficiency of wire glass was also demonstrated. A discussion was held over the electric pump, and the secretary read a paper by Prof. Lewes, of Greenwich, England, on "Causes of Fire and Its Prevention." The officers for the coming year were elected as follows:

President, James Smart, of Calgary, B. C.: vice-presidents, J. H. Carlyle, of Vancouver; J. E. Brown, of Redlands, Cal.; Fred H. Kelly, of Wallace, Idaho; W. R. Withee, of Pendleton, Oregon; secretary, H. W. Bringhurst, of Seattle; treasurer, E. B. Raymond, of Olympia. Vancouver was selected for the next convention.

LITERATURE ON MUNICIPAL TOPICS

Reviews of Some Important Books—What the Magazines and Reviews Have to Say About Civic Affairs—Municipal Reports Received

Books

The Use of Mineral Oil in Road Improvement, by James W. Abbott of the Office of Public Road Inquiries, is a reprint from the Yearbook of the U. S. Department of Agriculture for 1902 and takes up a subject that is daily becoming more important. It promises to supply the means of keeping the dirt roads, especially those of a sandy character, in good condition as nothing else can. In the west, where there is little rain and lots of sand, oiling the roads will be thoroughly tried and this pamphlet is designed to diffuse the latest information on the subject. After showing the benefits to be derived from the proper use of oil, the author tells how to prepare the oil for use, how to prepare the road, describes the machines for distributing the oil, what quantity of oil to use and the best kind, how to repair oiled roads, etc. There are a number of illustrations showing roads before and after oiling and blocks cut from the crusts of three roads in California after they had been oiled for some time.

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The New Zealand Official Yearbook for 1902 is the eleventh of the kind and has been much enlarged. It was prepared under the direction of the premier of New Zealand, Rt. Hon. R. J. Seddon, by Registrar-General E. J. Von Dadelszen. Its 690 pages are filled with information about New Zealand, its government, agriculture, topography, description of the cities, manufactures and a mass of statistics about the islands. Maps, charts and illustrations make more valuable the text.

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The Department of Agriculture at Washington has reprinted from its year-book a treatise on *The Contamination of Public Water Supplies by Algae* from the pen of George T. Moore, physiologist in the laboratory of plant physiology, and is well worth perusal by those who have charge of the water supplies of cities for it contains much information about the growth of the plants that often render a water supply unpalatable if not absolutely dangerous to health. Two colored plates show the form of the more common of these algae.

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Sooner or later the question of housing the people of cities will have to be met in the United States as it is being met in England and the Continent. Conditions are essentially the same in all big cities and the experience of the authorities in one large city will assist those of another in their work. That city is the wisest that when comparatively young, takes thought of poor housing conditions that are sure to exist if provision be not made to prevent their occurrence. The English authorities are as far advanced as any in housing schemes and are rapidly learning with experience the best ways of meeting such problems as are presented. The secretary of the National Housing Reform Council, W. Thompson, has written a book on this subject that involves an experience of twelve years spent in promoting housing schemes in different parts of England. *The Housing Handbook* is a practical manual for the use of the city authorities and those who are interested in plans to do away with slums and make habitable and healthy dwellings for the poor. His accounts of the workings of the different housing schemes throughout England and come cities on the Continent show what it costs to carry out these ideas, the great benefits to be derived, and the fact that a good profit can be realized from the undertaking. The municipal housing schemes that have been put in operation by the different cities have done much to relieve the distress in the slums and the authorities are constantly working to clean out the hovels and force the owners of the property to substitute decent dwellings. One who has had the experience of the author in this work is in a position to present the facts and figures as they are. There are a number of illustrations and plans showing the houses and cottages built by the municipalities. The work is divided into four sections taking up first the need for greater action along these lines, what may be done by the authorities, what local authorities have already accomplished, and what remains to be done and how to do it. The appendix contains the Housing of the Working Classes Act of 1890 and that of 1900, as well as other acts of a similar nature. Copies of this work may be obtained through THE MUNICIPAL JOURNAL. Cloth, 375 pages, $2.00.

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Periodicals

The World's Work for October contains an article by Zelia Milhau on the *"Block Beautiful,"* which describes the work undertaken by the Municipal Art Society of New York towards improving the appearance of the city streets. The experiment was first tried on Brooklyn Heights and met with such success that the "block beautiful" became the "district beautiful."

In this same issue Frederick C. Howe describes *Cleveland—A City Finding Itself.* New York, N. Y. Price $3.00 per year.

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Chicago—A Character Study, is the subject of an article in *Everybody's Magazine* for October, by Will Payne. The author brings out the characteristic points of the city, treating the matter facetiously at times, and is not slow to condemn many of the Chicago characteristics, while he speaks well of its good points. New York, N. Y. Price $1.00 per year.

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Proceedings for September of the American Society of Civil Engineers contains a paper by Eugen Goetze, chief engineer of the water works of Bremen, Ger., on *Filtration for Public Water Supplies,* with special reference to the double filtration plant at Bremen.

He destribes the operation of the water filters in Bremen, and recommends the double filtration of water wherever possible. In the case of the Bremen works, this extra filtration does not necessitate larger area of filter beds, inasmuch as when the greatest amount of water is needed, the quality of the water is better and double filtration is not necessary. When it is necessary, less water is consumed, and the large area needed for the greater amount of filtration is sufficient for a double filtering of the lesser supply. He calls attention to the fact that a filter bed with clean sand will not work well until there is formed over the sand a "schlammdecke," in which is retained the bacteria and the very fine particles of clay. Filters are called "ripe" when the film is formed. After starting filters, the worst water is not found until at least a day, because good water is still retained in the lower strata of the sand. Special attention should be paid to the regulating apparatus, which should be automatic, because it secures the greatest uniformity in the operation.

In Bremen, double filtration removes the fine clay that passed the first filter. Double filtration shows that, normally, bacteria from the effluent of a ripe filter are independent of the number contained in the raw water where the filtrate of the preliminary filter is the raw water of the final filter. Experiments show that a constant low number of bacteria, and not a percentage of reduction, should be used as a demonstration of the effective work of a filter; on the other hand, with extraordinarily bad water, containing many bacteria and being very turbid, it is found that a constant number of bacteria for the filtrate cannot be counted upon. The sand it not carried from the filter to the sand washer at the time of scraping, but is moved at some more convenient time. The newest sand washers require the services of one man, and he can wash two cubic meters of sand in an hour, using seven to eight volumes of water to one volume of sand.

A long article on *Dock Improvements at Liverpool* appears in this issue. This is illustrated by a number of drawings, showing the progress of the work. This issue also contains discussions on the *Resistances to the Flow of Water in Pipes* and *Sewage Purification.* New York, N. Y.

The October issue of *The Century* contains an article by L. O. Howard on *Yellow Fever and Mosquitos,* showing that the mosquito must be blamed for one of the greatest of human ills. New York, N. Y. $4.00 per year.

Edward T. Devine contributes a long article to the October *American Review of Reviews* on *Municipal Reform and Social Welfare in New York.* This article is a study of the Low administration in its relation to the protection of the tenement house population of the city, and the author shows how this new department is doing wonders for the dwellers in the squalid tenement districts of the city. It is forcing the owners of tenement houses to place, and keep, their properties in sanitary condition, and the methods by which this is accomplished are outlined by Mr. Devine, and illustrations are given, showing the "before and after" conditions. The department has a very complete and elaborate system of keeping records so that its officials can tell at once what has been done about any one house about which complaints have been made. The officials have found that owners often deny the existence of unsanitary conditions, but whenever any inspection is made, photographs are taken of the place, and this, more than any one thing, usually convinces the owner that the contention of the department is true. One of the great accomplishments of this department has been the driving of prostitution from the tenement houses. The law provides that a fine of $1,000 must be paid by the owner of any house permitting prostitutes to reside therein. As this fine is assessed against the property, and not the owner personally, there is no dodging the responsibility.

Mr. Devine reviews briefly the work of the Department of Public Charities, and shows how much it has bettered the condition of the poor and destitute, and he also tells of the work of the department of Parks in establishing play-grounds for the children, and of the installation of public baths and comfort stations. The work of the Health Department has been most important, and the low death rate of the city speaks well for the improvements that have been made. New York, N. Y. Price per year $2.50.

Electrolysis is the subject of an article in *Insurance Engineering* for September, and in it are pointed out the dangers to water and gas pipes from the stray currents of electricity. Instances are recorded where pipes laid but a short time were so weakened by electrolysis as to burst, with constant damage to buildings. An outline is given for different methods to prevent this trouble, and the article refers to experiments conducted at the Copenhagen Technical College, by means of which electrolysis was largely reduced by the use of alternating currents. In some cases it has been found that pipes have been connected to the rails have been carrying over 300 amperes of current, and, when it is considered that one ampere flowing from an iron pipe in a suitable electrolyte will corrode one pound of metal in one year, the possibilities of damage to underground pipes may be readily recognized.

German Methods of Testing Buildling Materials, a paper read by F. Taffe, architect to the Prussian Crown, before the International Fire Prevention Congress at London, is printed in this issue. This paper tells of the tests that were made by the authorities in Munich in 1885; in Berlin in 1893; in Hamburg in 1895, and in Charlottenburg at a later date. New York, N. Y., price per year $3.00.

The Arena for October has a very interesting article by Hon. Frederick F. Ingram, one of the commissioners of public lighting of Detroit, Mich.., on *Should the People or the Corporation Light Our Cities?*

The author states that "electric lighting from central stations is now clearly recognized by the general public as a monopolistic industry not subject to the laws of competition." He claims that the burden of proof is upon those who insist that public property should be used by a privileged few for private profit. The adoption of municipal ownership for any public utility is not new or radical, inasmuch as our forefathers refused to grant franchises for public utilities to private persons, and it was not until the early part of the Nineteenth Century that the use of public property for private gain was permitted. He argues, also, that history shows that when a community is convinced that a certain policy is best that policy is adopted, therefore when it is proved that municipal ownership of lighting plants is best, communities will return to first principles and provide themselves with their own lighting. The greater part of Mr. Ingram's article is taken up with a description of the municipal electric lighting plant of Detroit, and showing how successful this plant has been in providing cheap lights for the city. After eight years the cost per arc light has been reduced from $100.50 to $63.82 in 1892. This price included depreciation, lost taxes and interest at 4 per cent. on the investment. The percentage of depreciation is the one point disputed by opponents of this plant. It is placed at 3 per cent. by the city, and Mr. Ingram shows how this is arrived at. He also proves that his plant is giving good service to the city and that it is not run by city politics. Using his plant as an object lesson, he shows that the old argument that cities cannot operate a lighting plant successfully is fallacious.

Another of Lincoln Steffen's articles on municipal conditions in American cities appeared in the October issue of *McClure's Magazine.* His previous articles have had rather a discouraging effect upon readers of magazines, but this article presents a brighter view. *Chicago—Half Free But Fighting On,* is the subject of this article, and in it the author outlines the struggle for good municipal government that is being waged for over six years, when the Municipal Voters' League was formed. Beginning with the legislative branch of the city government, the League first fought until it prevented the re-election of corrupt aldermen, and then made a fight for the election of good ones later on. Non-partisan in its efforts, it used every possible means to secure good men for office. Prominent business men, and those in control of large business interests, who had regularly bribed city legislators to secure their ends, were some of the strongest opponents of the reform methods, many of these men acknowledging that they preferred to use bribery than to deal with aldermen that were honest. With the aid of Carter Harrison as mayor, the League secured the defeat of the "franchise grabbers," and secured the repeal by the State Legislature of the Allen Bill despite the efforts of the railway magnates to prevent it. Mr. Steffens shows how many who entered the ranks of the League grew faint hearted, and left to a few prominent characters the burden of the fight. The long fight developed such men as Walter L. Fisher, who is at present the reform "boss," for the League has wisely adopted some of the methods of the old bosses in securing its results. However, the League has no machine and not even a list of its voters, which are drawn solely from the great mass of honest men in the city who place every confidence in the League. This great mass of unattached citizens needed such a leader as the League has been to help them secure honest city government. The League itself consists of but a committee of nine and its officers, who play politics just as the politicians do, but in the interest of the city. Mr. Steffens considers that Carter Harrison is honest, but is without initiative, doing only what is demanded of him. He claims that Chicago is a city that wants to be led, but Carter Harrison simply follows. The reason that the League has not condemned the officials as well as the aldermen is because it has not gotten that far yet, preferring to make the legislative portion of the city safe first. New York, N. Y. Price per year, $1.00.

Municipal Reports Received

WE have been favored with a copy of the message of Mayor George H. Williams and the municipal reports of the city of Portland, Ore.

The twenty-eighth annual report of the Board of Park Commissioners of Boston, Mass., has been sent us.

We have been the recipient of the ninth annual report of the Department of Parks of New Bedford, Mass. The report is most artistically gotten up.

Chief David Campbell of the Fire Department of Portland, Ore., has favored us with his annual report.

The municipal manual for the city of Altoona, Pa., for 1903, has been sent us.

We have received copies of the reports of the fire departments of Newark, N. J., and Milwaukee, Wis. for 1902.

REVIEW OF MUNICIPAL REPORTS

Washington Should Be Metered—To Complete Sewer System in Somerville—Extensive Street Repairs Will Be Needed in Utica—Cost of Scraping Filter Beds

Street Conditions in Utica

ACCORDING to City Engineer Paul Schultze, of Utica, N. Y., the entire amount of pavement laid during last year was 3,602 miles and consisted entirely of asphalt. During the year, 2,086 miles of vitrified pipe sewer were laid, the sizes ranging from twelve to eight inches in diameter. The removal of ashes was attended with little complaint, and the standard of clean streets was as high as during the previous year, although the public service corporations kept them torn up to a much greater extent. The companies, however, promptly and properly repaved them at their own expense. While a small amount of patching on asphalt pavements was necessary, these favorable conditions cannot last, as the pavements are reaching such a point that constant patching or re-surfacing will be necessary. The report of the engineer contains a table showing the result of cement tests. These were made with different proportions of water and will prove valuable to any one interested in construction work.

Work of Somerville's Engineer

DURING the last year the city engineer's department of Somerville, Mass., planned and graded twenty-four public streets, with a total length of 2.65 miles; 6,458 square yards of new brick sidewalks and eighty square yards of granolithic walk, were laid. City Engineer Ernest W. Bailey has also charge of the sewers of the city, and states that the separate sewer systems has been extended considerably in the various streets of the city. In the East Somerville district the separate sewer system was started and will be extended until the entire area has been completed. The new system will be used for house drainage while the present sewers will serve as a storm drainage system. The city engineer has also charge of the public grounds of the city and considerable new work was undertaken, especially in completion of the park on Prospect Hill. Two illustrations accompany the report showing how the section was improved by grading, the once ragged hillside being turned into a beautiful slope.

Meters Needed in Washington

THE consumption of water in the District of Columbia is much too large according to the report of Col. A. M. Miller, the engineer in charge of the water supply. Measurements of the consumption was made every day and the average daily consumption for the year was 58,237,646 gallons, a consumption per capita of over 200 gallons per day. Col. Miller states that careful measurements made in the various cities of the country show that a per capita daily consumption of 100 gallons is ample for all domestic, business and public purposes and any considerable increase over this amount must be attributed to waste due to defective mains and service pipes, defective plumbing and willful waste. The present consumption and waste has an important bearing on the subject of filtration. The District is constructing a filtration plant and the estimated cost of filtered water will be $6 per million gallons or, at the present rate of consumption, $300 per day. This is a large charge, according to Col. Miller, and can only be reduced by a reduction in consumption. This can be brought about by one way and that is the introduction of the meter system. If this be not done, an increased supply must be secured to keep up the present rate of 205 gallons per capita. A second conduit and reservoirs must be constructed as well as a pumping plant. Regarding the use of meters, Col. Miller says: "The introduction of the meters will not prevent an abundant supply for all purposes, will result in a less water rate or expense to consumers and would throw the burden of waste where it belongs, on the shoulders of the careless and willfully negligent consumers."

Cleveland has had experience with meters that shows well the value of these instruments. The meter system was introduced in 1902 and in one year 10,770 instruments had been installed, three and one-half years being required to meter the whole city. From 1897 to 1900 there was an increase of 39 per cent. in the consumption; there has been a decline of 13 per cent. for the seven months of this year as compared with the corresponding period of 1902. The meters are placed in the basement or the street, the latter being preferred by the water department, although it costs nearly twice as much as to place them in the former position. The meters are placed in vaults two feet below the surface. These vaults are made of clay pipe similar to that used for sewers and a plate is put over the meter so as to leave an air chamber between it and the iron plate cover flush with the street level. No trouble has been experienced from freezing. The rate is 5 1/3 cents per 1,000 gallons with a minimum rate of $2.50 per year. The rate was first placed at $4 as a minimum, but on February 9 last reduced to the lower price. It is hoped by the authorities to soon bring the consumption down to 100 gallons per capita per day.

City Departments Should Pay for Water Used

THE Board of Water Commissioners of Lawrence, Mass., has made a strong plea for credit for water supply of the various municipal departments and for the use of fire extinguishment. It points out that twenty-eight per cent. of the total pumpage is used for domestic purposes and for this fifty-nine per cent. of the total water receipts is paid. This gives an average of sixteen gallons per capita per day at the rate of $1.12 each, per year. The total metered water is forty-eight per cent. of the total consumption, and for this eighty-four per cent. of the total receipts for water is paid, leaving but sixteen per cent. for unmetered service. Most of the citizens having unmetered service are careless in the use of water, and it is estimated that allowing for waste and leaks and four per cent. of the total meter consumption for loss of registration in meters from the total unmetered, there would remain thirty-four per cent. of the pumpage as the estimated quantity consumed in street sprinkling, flushing and fire protection. For this amount the department receives no credit or compensation. Mr. D. J. O'Mahoney, caretaker of the filter plant, reports considerable difficulty during the winter months, with the ice that forms, and therefore considers that a covered filter is preferable. It is necessary to remove, every day, from the beds being scraped, the ice that has formed during the night, and with this ice is taken the sand in the process of scraping. This adds to the expense of the work. Owing to this freezing a large amount of sand must be taken off during the winter months, and considerable difficulty is met with in breaking up this sand after it has frozen solid.

The number of acres scraped during the year amounted to thirty-four and one-half, at an average cost of $45.37. Allowing eighteen barrel loads to the cubic yard, a total of 2,202 cubic yards were removed.

A table in the report shows that between complete scrapings from 1893 to 1901, the longest period was forty-one days, and the shortest, thirteen, the largest total quantity of water filtered between scrapings being 121,000,000 gallons and the smallest amount 49,000,000 gallons, both these figures corresponding respectively to the longest and shortest periods given above. In 1901 there was a total of three hundred and twelve scrapings, the greatest number being in March, (thirty-one) and the smallest number in November (nineteen), the average being twenty-six. In this year there was an average of 10.4 inches depth of sand replaced on the beds.

The cost of scraping in 1901 amounted to $1,572,19 or $1.38 per million gallons of water filtered.

Regarding the washing of sand, in 1901 the cost for labor was $867.16 and the total $972.46, being much less than ever before. The cost per cubic yard was forty-eight cents, and the approximate volume of water used to sand washed was ten.

Exhibit of Road Machinery at State Fair

THE American Road Roller Company, with general offices at 156 Fifth avenue, and its plant at Groton, N. Y., had a fine exhibit of its products at the State Fair recently held at Syracuse, N. Y.

In the exhibition were the Oastler steam road roller, Groton traction engine, combination traction and steam roller, Star stone crusher, elevator and bins; Oastler A. B. C. sweeping machine, Oastler A. B. C. road and pavement scraper, American sanding wagon, Groton water wagons, American push-carts, and gasoline engines for marine and automobile purposes.

As the farmers and city and town residents in that part of the state are enthusiastically in favor of good roads, it is not surprising that this fine exhibition attracted the attention of thousands of visitors. The fact that Mr. William C. Oastler is president of the American Roller Company was sufficient in itself to attract a great deal of attention to the exhibit, because he has been so long and favorably known to city, town and road officials, not only in New York State, but throughout the country. The exhibit will accomplish much towards strengthening the favorable sentiment for good roads that has already been formed. Full particulars about any part, or all, of the exhibit may be secured by addressing the company.

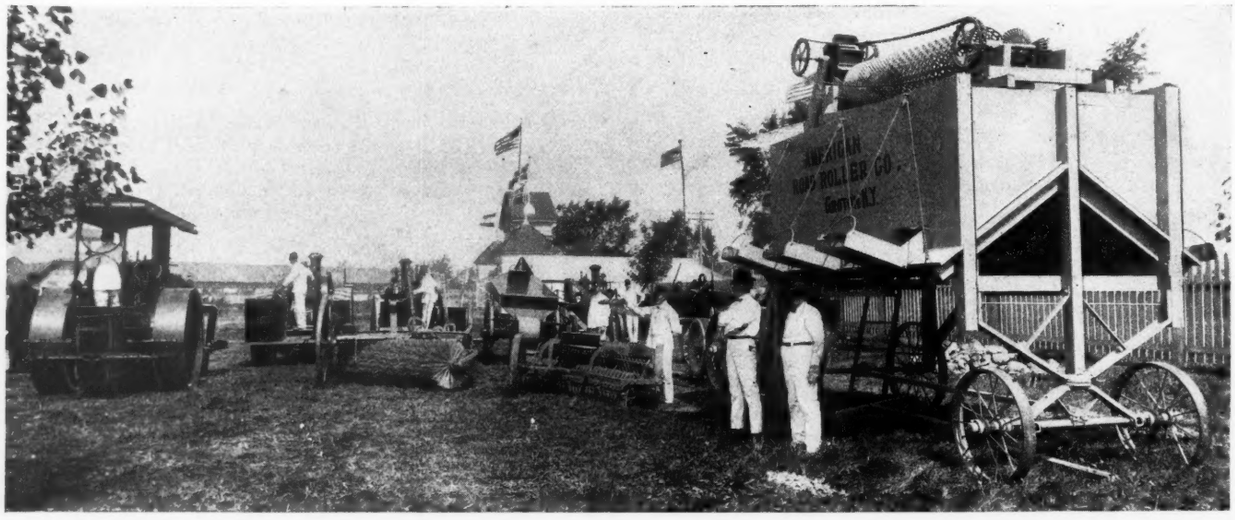


EXHIBIT OF THE AMERICAN ROAD ROLLER COMPANY AT NEW YORK STATE FAIR

Economy in Street Illumination

WHEN the craze for electric lighting first struck this country, many small municipalities burdened themselves either with a bonded indebtedness for the construction of an expensive municipal plant, or a long term contract calling for the payment of several thousand dollars per year to a private company for lighting the streets. If the work of street illuminating in these small municipalities had been efficiently done, there would have been less cause for complaint, but the street illumination has been inefficient and the citizens have been obliged to pay a large price for poor light.

In looking around for means of relief from this burden, many small municipalities have discovered that they can install, at comparatively slight expense, an acetylene town lighting plant, and, by the use of common sense in distributing the lamps, can secure a more efficient lighting system than that of electricity. By this means, they have been enabled to save thousands of dollars in the running expenses of the municipality.

However cheap a thing may be, its use is not considered good judgment if it is known to be dangerous. The safety of acetylene illumination, when "Colt" generators are used, has been established by the National Board of Fire Underwriters, whose expert engineers have examined this apparatus, and included it in the list of permitted acetylene generators, issued by the consulting engineers of said board, and these generators have also been adopted by various departments of the United States Government.

Acetylene gas has the same properties as other illuminating gases, it being no more and no less dangerous; it is not spontaneously explosive, nor has it any dangerous characteristics that are not common to all illuminating gases. There is less danger in using it than in using kerosene.

City officials, particularly in small towns, who are not familiar with this system of lighting, will find it to their advantage to carefully investigate this subject. Full information will be given by the J. B. Colt Company, 21 Barclay Street, New York.

American Sewage Disposal System

THE building of sewers and the disposal of sewage is second only in importance to the introduction of a good water supply in a municipality, and, in fact should closely follow such a supply. In one city, recently, the authorities would not consent to the placing of water in houses and the use of water closets until sewers were constructed These officials are to be commended for their stand in protecting the health of the inhabitants. The next step in the progress of this town will be the installation of a plant to dispose of the sewage so that it may not pollete the water courses running past the town and become a source of disease and nuisance to towns lower down the streams.

The building of a sewer system is usually looked upon as a large task in smaller towns and cities where professional services cannot be so readily secured as in larger places and the officials of such places where sewer work is contemplated will be interested in a booklet by John M. McClintock, C. E., A. M., issued by the American Sewage disposal Company, of Boston, which discusses the construction of sewer systems, giving some idea of the cost and the design. The company is prepared to furnish plans and estimates and supervision of the work of sewer-building for any place, for 10 per cent. of the cost of construction; or, it will build the sewers or disposal works at cost and accept 10 per cent. additional for the plans, supervision and profits. In permitting this company to take entire charge of the construction all responsibility is shifted on to the company, and, as it is in position to operate and maintain the systems, it is to its interests to see that the best of work is done. Skill, experience and judgment are required for the proper construction of a sewer system and all its branches and this the company can supply. Without these qualifications in the supervising engineer a system stands a good chance of being ruined and the town's money wasted.

Valuable patent rights are possessed by this company in regard to sewage disposal by septic tanks and single and double intermittent

filtration, with necessary ventilation, and in this booklet it is claimed that the company can dispose of the sewage of any municipality from the largest to the smallest village. The waste product of these filters is to be used for manurial purposes.

In telling the story of the patents it is stated that, in 1880, Amasa S. Glover, of Brocton, Mass., discovered the principle of the septic tank and received a patent on it in 1882. In 1886 he recommended to Brockton the added treatment of filtration and obtained a patent for double filtration in 1895. It is on these records that the company claims the ownership of the idea of the septic tank treatment for sewage and it is prepared to defend its title. All the patents obtained by Glover were transferred to this company.

A description is given of the sewage disposal works installed at Brentwood, N. H., in 1895, under these patents and will serve as a model. This takes care of the sewage of a large county establishment and the superintendent states that it practically runs itself. The sewage sludge is composted with loam or ashes and has more manurial value than manure from barns and stables.

In showing the commercial advantages of disposal works, it is pointed out in this booklet that those towns and cities that have put in successful sewage disposal plants have quickly increased in population and importance and the State of Massachusetts has taken the lead in this country in the investigation of sewage disposal. The importance of disposing of the sewage of any community so that the nearby waterways are not polluted cannot be too strongly urged and the time is coming when all the sewage of municipalities will be treated and purified before being discharged into river or lake. With the filtration of the water supply, which this company is also in position to undertake, the disposal of sewage will make typhoid fever and all water-borne diseases a thing of the past.

A report on the adaptability of this method of sewage disposal to the needs of Baltimore, by Mr. McClintock, to the mayor of that city, is appended to this book and will be of interest as showing the method, cost and plans of a plant large enough for a city of 600,000 inhabitants.

Copies of this booklet may be obtained on application to the American Sewage Disposal Company, 45 Milk street, Boston.

Kreodone Pavements in Indianapolis

(By Our Special Correspondent.)

THE delegates and visitors at the recent meeting of the American Society of Municipal Improvements were driven over the city on Wednesday afternoon of the meeting, and had an excellent opportunity for observing the street pavements. The main plant of the Republic Chemical and Creosoting Company, producers of the Kreodone wood block pavement, is located at Indianapolis, and many miles of the broad, shaded streets of that city are improved with this material. It is a very popular pavement in the Capital City, and to its extensive use is very largely due the reputation of the city for being well paved.

The trip over the city in carriages, which was one of the features of entertainment for the delegates, gave them a practical object lesson in the durability of the Kreodone wood block pavements. Some of these pavements, which have been under heavy traffic for years, are perfectly smooth and showed practically no wear at all. In several places, where combination curb and gutters are used, it was observed that the cement gutter was worn down two or more inches where it abutted the blocks, leaving the corners of the blocks exposed, but in no instance were these corners even chipped from the traffic on the street. One of the streets on which this condition was noticed was West Morris Street. This street is the main thoroughfare leading to the Inter-state and Union Stock Yards and carries all the heavy traffic from these yards as well as from the Nordyke and Marmon plant and a number of other large manufacturing establishments. The Kreodone pavement on this street after six years of this rough usage is not appreciably worn and is as smooth as the day it was accepted from the contractor by the city. In fact, there was no noticeable difference between the oldest and the newest Kreodone pavements. The contrast between the Kreodone and the brick and asphalt streets was forcibly demonstrated in the drive. When the carriages turned upon a Kreodone pavement they rolled along smoothly and noiselessly and the horses had a sure footing that was noticeable the moment they touched the pavement.

After the drive was completed those who had made the trip were very pronounced in their commendation of the Kreodone pavements. A few were somewhat surprised at what they considered a remarkable showing of durability. The opportunity afforded for examination of miles of the pavement in service, demonstrated the validity ot the claims made for it by the manufacturers. The Kreodone pavements have been developed to the point of being non-expansible. They are now laid without expansion joints and recent tests of blocks made by the City Civil Engineer of Indianapolis demonstrated the truth of the Company's claim, that the blocks were absolutely impervious to moisture and non-absorbent even under the severest tests.

Vertical Filing Cabinets

THE system of vertical filing is now conceded to be the only successful method of filing correspondence in such a way as to keep track of it and produce it on the shortest possible notice. It economizes space, permits immediate reference to any letter, eliminates the possibility of error to a minimum, while transferring is rendered simple and easy. When this system is thoroughly installed and carefully operated, it is impossible to lose track of a single document.

There are no better cabinets made than those manufactured by the Berger Manufacturing Company, of Canton, Ohio. The vertical filing cabinets manufactured by this company are so constructed as to size as to be adapted to any business, whether large or small.

It should be borne in mind that the advantages of the steel office furniture, including filing cabinets made by this company, are so many and so palpable that it is only necessary to enumerate them. Said a well known manufacturing man, who had used them for a long time, "there is not a solitary point that, to the man of average practical knowledge, would require demonstration. Steel furniture is many times stronger, more durable, more graceful and—cost for cost and life for life—more economical than wood furniture of any other kind. I have been perfectly delighted with the furniture which I have used."

New Elevated Escalator

The moving staircase at the Twenty-third street station on the Sixth avenue elevated railroad has been so great a success that the Interborough Rapid Transit Company, which leases the Manhattan elevated, is installing one at Thirty-third street and Sixth avenue.

The new escalator will be an improvement over that at Twenty-third street, for it will be a double one, communicating both with the uptown and downtown platforms and with both sides of Sixth avenue. Passengers who wish to cross Sixth avenue to reach the uptown staircase to the elevated there now have to dodge the Sixth avenue trolley cars and the heavy street traffic, complicated by the Thirty-fourth street crosstown cars.

The big new department stores at this point have trebled the traffic at the Thirty-third street station. They have increased the street traffic also, and women especially are timorous about attempting the crossing. When the Interborough's improvement is completed they won't have to.

The escalator will carry them up on the west side of the street and an overhead bridge will take them across the elevated tracks to the uptown platform. A similar arrangement will make it unnecessary for passengers from Broadway and the east side of Sixth avenue to risk being run down in crossing the network of trolley lines to reach the downtown platform.

Workmen are now busy on the staircases, and they are expected to be in operation in a few weeks.—*N. Y. Sun.*

Glazier Universal Nozzle

A nozzle that can look after itself when once placed in position is certainly a most valuable adjunct to the fire appliances of any department. The accompanying illustration shows the Glazier Universal Nozzle attached to one of the hose wagons of the Atlantic City Fire Departments. As will be noticed the nozzle is set at an angle which was maintained under and amount of pressure until it was desired to project a stream in another direction. One man can easily look after this nozzle irrespective of the number of streams that may be siamesed into it. The danger to the men from falling walls is in a great measure eliminated, when it is considered that the nozzle may be placed upon the ground and a stream played in the desired direction without any one remaining near it. Should a wall fall in the direction of the nozzle, no injury need be sustained by the men usually assigned to look after the stream, as, in dangerous situations, the stream can be left to take care of itself.

GLAZIER NOZZLE THROWING VERTICAL STREAM

The Glazier nozzle is not held by appliances of any kind, and will remain where placed. The nozzle shown in the illustration can be used to throw a stream 1½ to 2 inches in diameter, and a distance of at least 250 feet. It is supplied with three lines of hose, but, if at any time an accident befalls one or more of the streams, an automatic valve at the base of the nozzle cuts off the injured part, and the other lines continue to feed the nozzle. This obviates any need of shutting off the water supply while repairs are being made to a disabled line of hose.

The tests of this nozzle made at the recent convention of the International Association of Fire Engineers, held at Atlantic City in September, under the direction of Messrs. Bradley and Munson, the general sales agents, were so successful that the underwriters of Atlantic City requested that another test be made before the fire committee of the city council.

Items of Interest to the Trade

—The Diggs Fire Extinguisher Company, 143 Center Street, New York, is shipping eleven 2-wheeled chemical engines to Johannesburg, S. A.; Bombay, India, and has several orders on hand for village departments in this country. It also has in the works at the present time, orders for single and double 20, 25 and 35-gallon engine tanks for placing on the hook and ladder trucks. Its 3, 5 and 6-gallon hand extinguishers with the "Digg's Device," for sealing the acid receptacle and releasing the bottle without breaking, is now recognized as the standard for fire department use.

—Mr. Charles E. Geulich, of Detroit, has been engaged by the Hungarian Asphalt Company, Limited, to put up American machinery for refining, as well as plants for sheet asphalt paving in Hungary. This will be the first time that sheet asphalt paving has been laid with American machinery in that country.

—The Continental Trust Company of the City of New York, Receiver for the Standard Vitrified Conduit Company, 39 Cortlandt street, New York, has on hand a large stock of multiple and single type conduits in all sizes. The factories are now in full operation, producing over 80,000 duct feet of conduit per day, and it is prepared to make immediate shipment. The orders of patrons are solicited on the basis of immediate delivery. The company states that if style and number of duct feet required are given, it will quote low prices f. o.b. on cars or at destination. The Company declares its ability to do this regardless of rumors in the trade to the contrary. The excellent quality of the products of this Company has been recognized in the past, and it proposes to continue to send out the same class of goods.

—The J. B. Colt Company, 21 Barclay street, New York City, has put in several town lighting systems which have worked satisfactorily. Acetylene gas is destined to replace many of the expensive electric light plants now in operation in different municipalities, as it has been thoroughly demonstrated that an acetylene gas lighting plant can be constructed and operated much more economically than the old style electric light system; at the same time, the work will be done more efficiently. Full particulars can be had by addressing the Company.

—The Toledo Construction and Supply Company, Toledo, O., has recently installed, for the city of Detroit, a municipal plant for the repairing of asphalt pavements. This plant is equipped with all the latest improvements, including hot and cold sand elevators, sand-tank, sand-box and asphalt bucket. The plant is especially designed for any kind of street pavement work and weighs complete, 3,600 pounds; is portable and can be readily moved by horse power or by steam rollers.

Regulation of Water Rates

A RECENT decision in Tennessee provides that the ponce power of the city extends to the regulation of water rates. The city of Knoxville brought suit against the Knoxville Water Company to compel it to reduce its rates. The Water Company resisted on the ground that the ordinance under which it was doing business impaired the obligations of prior contracts and was therefore void. This ordinance gave the municipal authorities the power to regulate the water rates, and it was the enforcement of this ordinance that caused the suit.

Liable for Property Depreciation Due to Street Opening

THE Supreme Court of Wisconsin recently handed down a decision that will affect all the cities in the State. The Court holds that the city of Milwaukee was a trespasser and liable to damages to the property owners because, in grading and paving a certain street, it cut down the thoroughfare from nine to twenty-eight feet, leaving the property on either side practically inaccessible and worthless. The assessments for benefits, however, ranged from $300 to $600 a lot, and in many cases it was necessary to sell the lots for the assessments, as the depreciation in the land bankrupted the owners. The two lower courts sustained the city, but a combination of property owners took the matter to the Supreme Court, with the above decision. In the cases in question, the city will have to pay about $20,000 damages, but the decision is so sweeping that other suits will be brought, as there are many cases where streets were opened in the same way as was that which caused the present trouble.

Trade Publications Received

—The Atkins Wagon Works, Auburn, New York, tells the story of the Atkins Dumping and Stone Wagons in a twelve-page booklet with cover. The illustrations used are such as tell a story in themselves. Price list and further particulars can be obtained upon application.

—The advantages of the American Process Dryer are graphically presented in a sixteen-page booklet, with cover, recently issued by the American Process Company, 62 William street, New York. The merits and virtues of this piece of apparatus are briefly but forcibly told.

—The annual illustrated catalogue and price lise of valves, hydrants, etc., of the Kennedy Valve Manufacturing Company, of 57 Beekman street, New York City, has just come to hand. It contains 128 pages bound in a handsome red cover. All officials connected with waterworks and other departments will be interested in this catalogue.

—The Studebaker Bros., South Bend, Ind., manufacturers of wagons, carriages, automobiles, harness, have taken time by the forelock and issued the Studebaker Farmers' Almanac and Weather Forecast for 1904. Besides furnishing a lot of valuable information relative to the weather, it contains numerous tables, and incidentally describes its various products. It is a telling advertisement.

—The Automatic Electric Company, of Chicago, tells all about the advantages of the Automatic Telephone System in a forty-eight page booklet with cover. It is fully illustrated and copies can be had on application.

—The Bulletin for September, 1903, Series F, No. 1, consisting of eight pages, well illustrated, issued by The D'Olier Engineering Company, Philadelphia, Pa., has been received. It is full of interesting matter about the work of this Company.

—Modern Road Building is the subject of a sixteen-page booklet, with cover, recently issued by the Port Huron Engine and Thresher Company, Port Huron, Michigan. The illustrations used show how modern road building machinery can be operated to advantage.

—"Obispo Asphalt from the Mine to the City," is the title of a twelve-page folder, with cover, recently issued by the Globe Asphalt Company, 405 Bakewell Building, Pittsburg, Pa. It takes particular pains to tell its readers that it has no affiliation or connection with the defunct or re-organized asphalt trust. It contains matter which cannot fail to interest city engineers and others who have to do with city construction.

—Fisher's Hydraulic Stone System, 384 Second street, Memphis, Tenn., is the title of a sixteen-page booklet, with cover, recently issued. Mr. W. H. Fisher is the patentee. The booklet describes the system, and furnishes illustrations of its extensive use throughout the country.

—The Austin Manufacturing Company, of Chicago, has just issued an 84-page booklet with cover. It is handsomely gotten up, and profusely illustrated. Its illustrations show many of the plants installed by this concern in various parts of the country in operation. Everyone interested in good roads, and good streets, should ask for a copy of this booklet.

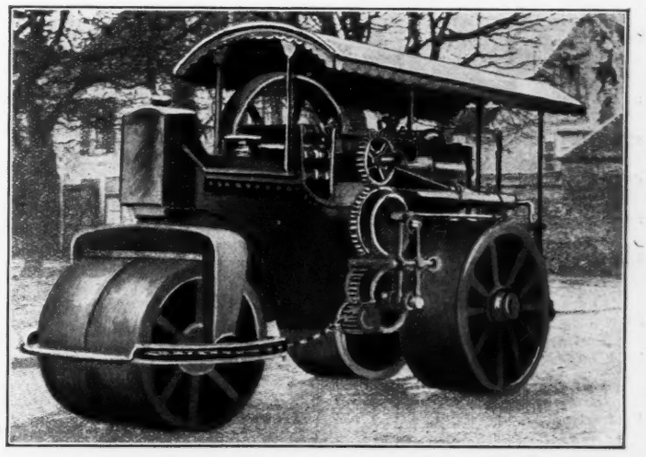
—The Otis Elevator Company, 17 Battery Place, New York, has recently issued a four-page leaflet, telling an illustrated story of the installation of several escalators in department stores and in connection with the elevated railway in New York City.

—The General Fire Proofing Company, of Youngstown, Ohio—New York office 156 Fifth avenue, has recently issued a sixteen-page booklet, giving a few reasons for the use of Herringbone Expanded Steel Lath, and describing and illustrating how it is to be used.

—Steam Power Plants of the Pacific Coast, is the title of an attractive brochure lately issued by Charles C. Moore and Company, Engineers, main office 63 First street, San Francisco, California—New York office, Havemeyer Building. The booklet illustrates and partially describes some of the work these engineers have done in the past few years on the Pacific Coast and the Hawaiian Islands.

Oil-Burning Road Roller

THE use of the oil engine for running road rollers has been extensively tested in France and now an English firm has put out a road roller run by oil that is meeting with great success. The total weight of the roller is about seventeen tons. The oil engines are of 16-horse power. For starting purposes a compressed air reservoir is employed, the charge being obtained from the engine when at work. The entire engine weighs 7,000 pounds, has a speed of 180 revolutions a minute and its dimensions are ten feet long by five feet wide. The ordinary



brands of petroleum are utilized and the oil consumption is about three-quarters of a pint per horse power per hour. A vaporizer is used and in it a small portion of the air charge is heated, which assists in vaporizing the oil, the mixture then passing through a valve into the combustion chamber of the engine cylinder, where it meets the main charge entering through the air valve. A lamp is used for heating the vaporizer and ignition tube, and is automatic, the fuel supply coming from a separate reservoir, which can be renewed without stopping the engine. The vaporizer is maintained at a constant temperature and the engine can work well whether under full load or running light. Stopping and starting can be effected instantly without reheating of the vaporizer.

CONTRACT NEWS FOR THE MONTH

Including Paving, Sewerage, Water Supply, Lighting, Public Buildings, Sewage and Garbage Disposal, Fire Supplies, Contracts Awarded

N. B.—All news of proposed work sent us by city officials is incorporated in our Weekly Advance News Service and appears subsequently in this "Contract News for the Month" if the date of the reception of bids be sufficiently late to warrant placing the item here.

City officials and others are urged to send us all news of contemplated improvements for use in our Weekly Bulletins which are mailed to those interested.

PAVING, PAVING MATERIALS AND MACHINERY

Alhambra, Cal.—There has been some discussion regarding the widening of Main street.

Altoona, Pa.—The Common Council has passed an ordinance to pave 11th avenue.

Atkinson, Kan.—It is reported that 10th street will be graded, curbed and paved with brick.

Baltimore, Md.—Asphalt block may be placed on Payson and Ducatel streets. McCulloch street may be asphalted. Ordinances were recently passed calling for $381,000 worth of paving.

Baraboo, Wis.—It is stated that $6,000 will be spent on macadamizing a road. Eighth avenue will be paved.

Berkeley, Cal.—Several streets will be macadamized.

Bessemer, Cal.—Ordinances for paving several streets have been under consideration by the Council.

Boston, Mass.—Bussey street is to be widened at a cost of $11,000. It is stated that $455,000 bonds are to be issued for the improvements of streets.

Bowling Green, O.—West Wooster street will be improved. Alex. Wiliamson, Clerk.

Bradford, Pa.—The paving of E. Main street has been under consideration.

Brattleboro, Vt.—A petition has been presented asking for a highway.

Brooklyn, N. Y.—It was voted to extend Flatbush avenue to Bridge No. 3.

Chester, Pa.—A vote will be taken in February on $210,000 bonds for paving.

Chicago, Ill.—Estimates for asphalting Root street will be prepared.

Cincinnati, O.—An ordinance provides for the asphalting of Laurel street and the laying of granite curbs. Edwin Henderson, Clerk.

Cleburne, Tex.—It is reported that $25,000 bonds for paving have been under consideration. Mayor Keating.

Cleveland, O.—Ordinances have been passed for the paving of a number of streets. Peter Witt, City Clerk.

Clinton, N. C.—A vote will be taken on November 3 on the issue of $20,000 bonds for improving roads in Sampson County. Board of County Commissioners.

Columbus, O.—Estimates place the cost of laying brick on 1st avenue at $20,453 and to asphalt at $24,265. City Engineer.

Conshohocken, Pa.—A vote will be taken in November on improving streets.

Des Moines, Ia.—Resolutions have been passed calling for the curbing of two streets. E. R. Bennett, City Clerk.

Dixon, Ill.—New bids are reported as being wanted for paving 1st street and North Galena avenue. Board of Local Improvements.

Elizabeth, N. J.—Bids are wanted on November 2 for Telford paving on DeHart place—1,225 square yards. City Engineer Luster.

Emporia, Kan.—Union street may be paved with brick.

Erie, Pa.—A bond issue of $70,000 for public improvements has been passed.

Findlay, O.—Asphalt block will be laid on West Sandusky street and brick on West Front street. City Engineer Riegle.

Fort Scott, Ark.—A petition asks the macadamizing of Holbrook street.

Fremont, Neb.—Petition asks the laying of brick on 2nd, 3rd, 4th, and F streets. City Clerk Stiles.

Grand Rapids, Mich.—Asphalt block may be laid on Scribner street.

Greenfield, Mass.—It is said that $6,500 will be spent on a State road to the north of this place. Board of Selectmen.

Hancock, Mich.—The cost of paving on Quincy street will be estimated.

Havre, Mont.—The grading and boulevarding of resident street have been under contemplation. City Engineer C. W. Swearington.

Hickory, N. C.—It was voted to issue $10,000 bonds for street improvements. The Mayor.

Houston, Tex.—It is reported that $300,000 bonds for paving will be issued.

Indianapolis, Ind.—Plans are ready for improving Pleasant Run and another boulevard.

Ironton, O.—It is reported that $25,000 bonds for improving street will be issued. Mayor J. H. Moulton.

Joplin, Mo.—Resolutions were passed calling for the grading and macadamizing of Joplin and 13th streets. City Clerk E. C. H. Squire.

Livingston, Ala.—Good roads will be built in Sumter County. Judge of Probate.

Los Angeles, Cal.—Ordinances provided for the paving and sidewalks on various streets. City Clerk H. G. Lelande.

Lowell, Mass.—The Council has voted $26,000 for paving on several streets.

McKeesport, Pa.—There has been talk of laying about $150,000 worth of paving.

Memphis, Tenn.—A petition asks the paving of Beal street.

Morrison, Ill.—It is stated that 7,000 square yards of paving and 2,600 feet of cement curb will be laid.

New Orleans, La.—Plans are ready for the paving and draining of five streets. Octavio street may be asphalted. City Engineer Hardee.

New York, N. Y.—It is said that Riverside Drive may be extended 10 blocks, at a cost of $743,336. The Board of Estimate has decided to open Tremont avenue, at a cost of $205,000.

Northeast, Pa.—There has been talk of paving Main street.

Omaha, Neb.—It was reported that 24th street might be paved.

Ottawa, Kan.—New bids may be asked for the laying of 22,800 square yards of brick paving. City Clerk Quin.

Painesville, O.—Plans are being made for the paving of St. Clair street. City Engineer.

Passaic, N. J.—Union avenue will be graded, curbed, etc. City Clerk T. R. Watson. Columbia avenue will be macadamized with trap rock and limestone.

Perth Amboy, N. J.—A petition asks the macadamizing of Rector street.

Philadelphia, Pa.—$500,000 has been recommended for the paving of several streets.

Pittsburg, Pa.—Reports state that an asphalt repair plant may be provided for the city.

Pleasanton, Tex.—$50,000 will be issued for the construction of roads. County Judge.

Port Arthur, Tex.—It was voted to issue $20,000 bonds for the macadamizing of Proctor street. The Mayor.

Portland, Ore.—The cost of grading on Paton avenue is placed at $10,000. City Engineer Elliott.

St. Augustine, Fla.—Petitions call for brick on San Marcos avenue.

St. Joseph, Mo.—Will pave with brick, curb and grade on Seventeenth street and others. City Clerk Frank W. Beach.

St. Paul, Minn.—A boulevard will be constructed. Rice River voted $4,000 bonds for good roads. Jonas Finnily, Town Chairman.

San Diego, Cal.—There has been talk of issuing $200,000 bonds for roads.

Santa Barbara, Cal.—It is reported that $40,000 is to be spent on a boulevard on the east water front. City Clerk.

Seattle, Wash.—Will spend $127,000 on the improvement of streets. Will open and widen Pike street. City Engineer Riplinger.

Springfield, Ill.—A petition asks for paving in the South End. Board of Local Improvements.

Springfield, Mass.—Petition asks wood paving on Main street. Board of Supervisors.

Sterling, Ill.—$50,000 will be spent on paving three streets.

Streator, Ill.—It is reported that two miles of brick paving will be laid. City Clerk.

Taunton, Mass.—The sum of $12,000 for highways has been under consideration.

Toms River, N. J.—Bids are wanted on November 10 for three and one-fifth miles of gravel road. Board of County Freeholders.

Trenton, N. J.—Asphalt will be laid on Division street. City Clerk Murray.

Upper Sandusky, O.—It is reported that $50,000 bonds for paving on Sandusky avenue were to be issued.

Vicksburg, Miss.—There has been talk of paving Washington street. City Engineer Polk.

Visalia, Cal.—The paving of East and West Main streets has been under consideration.

Warren, Ind.—After January 1, 1904, one-half mile of brick paving will be laid. President Board of Trustees.

Waterbury, Conn.—$9,000 is favored by the Board of Pbblic Works for streets. City Engineer Cairns.

CONTRACTS AWARDED

Akron, O.—Contracts for brick and block paving have been awarded to J. M. Davidson, James Wilder, and Dan O'Marr.

Altoona, Pa.—Contract let William H. Herr for brick paving on 13th street at $1.20 per square yard.

Ashland, Ky.—T. S. Mulligan, Lima, O., has the contract for paving Center street.

Assumption, Ill.—Contract awarded Hurt & Company, Decatur, for paving at $1.47 a square yard.

Atchinson, Kan.—The contract for brick on Commercial street was awarded F. P. Halsey, St. Joseph, Mo., at $1.27½ per square yard.

Belvidere, Ill.—Contract for asphalting awarded the New Century Paving Company, Elgin.

Camden, N. J.—The Vulcanite Paving Company received the contract for asphalt on four streets at $1.87 a square yard.

Canonsburg, Pa.—Contract for brick paving let the Hallam Company, Washington, Pa.

Champaign, Ill.—John W. Stipes has the contract for paving North Race street.

Chicago, Ill.—Contract let Citizens' Construction Company for granite on Milwaukee avenue at $65,000.

Cincinnati, O.—Contract for paving on West 8th street awarded A. J. Henkel & Bro., Rodman Building. Also for macadamizing a road.

Connersville, Ind.—Contract awarded Williams Bros. for eight miles of cement curb and gutter at 52 cents a linear foot.

Columbus, O.—Contract awarded D. E. Sullivan & Son, North High street, for Nelsonville brick on West 1st street. O. Henderschatt has the contract for paving on Sherman and Garfield avenues.

Decatur, Ind.—Contract awarded Henry Streicher for $60,000 worth of paving.

Dallas, Tex.—Brow & Dabney, 291 Main street, has the contract for paving Harwood street.

Decorah, Ia.—Contract for brick paving let A. C. Koenig, Omaha, Neb., at $1.69 per square yard.

Delphi, Ind.—Contract for 19 miles of gravel road awarded Capt. F. S. Eaton, Lafayette, Ind.

Des Moines, Ia.—Shepard & Hanrahan has the contract for paving on W. 15th street at $1.69 per square yard. This firm also bid the lowest at $1.75 for paving on State street.

Dixon, Ill.—W. H. Rink has the contract for macadamizing Peoria avenue. Duffy & Hubbard has the contract for paving at $10,036.

Duluth, Minn.—Contract for grading Waverly avenue let Hugh Steele.

Elkton, Md.—E. Ward Brown, Port Deposit, has the contract for two miles of road.

Evansville, Ind.—Anchor Paving Company has the contract for laying walks, curbs and gutters for one year at $1.17 per square yard for the walk.

Ft. Ethan Allen, Vt.—E. F. Moore received the contract for 22,000 square yards of macadam road, etc.

Ft. McPherson, Ga.—Contract let Byon Souders, Empire Building, Atlanta, for concrete walk at $1.69½ per square yard.

Ft. Scott, Kan.—Contract for 9,705 square yards of brick on Judson street awarded S. A. Drake at $1.41.

Freeport, Ill.—Contract for macadam on Douglas avenue let William Ascher at $17,018.

Hagerstown, Md.—Contract for 6,000 square yards of Clearfield block let John T. Clarkson at $1.96 per square yard. City Clerk Beard.

Harrisburg, Pa.—Contract for creo-resinate wood block paving on Pine street awarded the U. S. Wood Preserving Company.

Jackson, Miss.—Contract for 12 blocks of brick walks let Wallace & Anderson.

Jacksonville, Ill.—Contract for paving on Westminster, Park and Grove streets awarded to A. F. Franks at $30,000.

Kearny, N. J.—Contracts awarded Wright & Lindsey, Orange, for macadam on Laurel and Eilshemins; to David Harper, Harrison, for macadam on Alpine and Terrace places and Oakwood avenue; and to Van Keuren & Son, Jersey City, for brick on Chestnut street.

Keokuk, Ia.—Henry Rees bid $1.40 square yard for brick on 10th street.

Lake Charles, La.—Contract for brick on Ryan street let Baer & Pringle, Kansas City, Mo.

Lawrence, Mass.—Contract let Charles Chambers & Son for grading and macadam on several streets.

Lexington, Mo.—Sherwood Drake has the contract for brick paving at $50,000.

Lincoln, Ill.—Contract for one-half mile of brick paving let John F. Bretz & Son, Springfield.

Middletown, Conn.—J. O. Peckham has a contract for a State highway.

Milwaukee, Wis.—D. D. Danielson has contract for cement walk in Mitchell Park.

Moline, Ill.—City Engineer Paddock informs us that the contract for asphalt, curb and grading on 11th avenue was awarded the Barber Asphalt Company.

Monument Beach, Mass.—Contract for 1¼ miles of highway let C. H. & Jas. A. Thomas, Middleboro.

Newark, N. J.—The U. S. Wood Preserving Company, New York, has the contract for 1,300 square yards of creo-resinate wood block paving on Park street.

New Haven, Conn.—Contract for macadam on Newhall street let F. Brazos, 808 Elm street, at 63 cents a square yard.

Niagara Falls, N. Y.—The German Rock Asphalt & Cement Company has the contract for asphalt on Ashland avenue.

Niles, Mich.—Contract for brick on North Front street let C. H. Defrees, South Bend, Ind., at $1.36.

Norwich, Conn.—Burns & Chicolo, Norwich, bid the lowest on gravel road at 79 cents per linear foot.

St. Joseph, Mo.—Contract awarded the Barber Asphalt Company for 26 blocks of paving at $1.85 per square yard. The St. Joseph Street Construction Company has the contract for paving with Kentucky rock asphalt on Frederick avenue at $1.40 per square yard.

St. Paul, Minn.—Contract let Fielding & Shepley, 217 West University avenue, for curbing and grading Portland avenue.

Seattle, Wash.—Contract for concrete walks let Sparger Concrete Company and Barnes & Carteek.

Shelby, O.—Contract awarded F. L. Rice for paving on Walnut street at $4,124.

Superior, Wis.—Contract awarded Erickson & Baxter for macadam on Banks avenue.

Sycamore, Ill.—Federal Asphalt Company has a contract for asphalting State street at $18,822. Concrete let Col. Reed, Elgin, for $30,000 worth of paving.

Tiverton, R. I.—Contract for one mile of road let H. C. Osborn.

Toledo, O.—Garrigan Bros. has the contract for macadam on Road No. 40. Contract for paving on Floyd street let Russell & Jennison.

Urbana, Ill.—Contract let John W. Stipes, Champaign, for Clinton Block on North Race street.

Waukesha, Wis.—Contract for brick on William street let F. Boortz.

Westbrook, Conn.—Contract awarded Roger Kennedy, Middletown, for 11,151 feet of road.

Westchester, Pa.—Contract let William H. Doyle, Berwyn, foa mile of road.

Wellston, O.—Contract let Beeson Bros., Middleport, for Sciotoville brick on Railroad avenue.

Woodbury, N. J.—Contract for Porter block on Cooper street let B. F. Sweeten & Company, Camden, at $20,700.

WATER SUPPLY

Allegheny, Pa.—Director of Public Works McIlwain desires a new reservoir.

Alpena, Mich.—It was reported that water works were under contemplation.

Anderson, Ind.—The Water Board is considering plans for a filter plant.

Ashland, Pa.—Plans were to have been made for a supply of water. J. B. Garner, Engineer.

Athens, Pa.—It is stated that mains were to have been laid—10 miles of 6 and 8-inch pipe.

Atlanta, Ga.—Reports stated that $75,000 was to be spent on water mains. City Engineer.

Attleboro, Mass.—It was voted to issue $30,000 water works bonds.

Ballard, Wash.—A site has been obtained for a reservoir.

Bardstown, Ky.—Plans for water works have been made. The Mayor.

Baton Rouge, La.—Steps are being taken to secure municipal water works.

Bay City, Mich.—A vote will be taken on April 4, 1904, on the issue of $50,000 bonds for improving the water works.

Big Timber, Mont.—There has been talk of putting in a standpipe system of water works.

Blasdell, N. Y.—Plans for water works are being made by Busch & Percival, Mooney Building, Buffalo.

Bordentown, N. Y.—City will rebuild water works of the local company when they are purchased.

Bottineau, Mont.—There has been talk of securing water works.

Burke Falls, Ont.—It will cost $30,000 to put in water works. Village Clerk Bazelt.

Canon City, Colo.—Water works will cost $100,000. City Engineer Smythe.

Carlisle, Ky.—Surveys are being made for water works by Henry Stubing, Louisville, Ky.

Chester, Ill.—Estimates place the cost of water works at $100,000.

Cincinnati, O.—Plans for a filtering plant place the cost at $1,000,000.

Clinton, S. C.—Talking of an electric light plant and water works.

Columbia, Mo.—Council wanted data as to the cost of water works and an electric light plant. J. S. Bicknell, Clerk.

Columbia, S. C.—Surveys will be made for proposed water works. J. L. Ludlow, Winston, N C., Engineer.

Concord, N. H.—May install new pumps in the North End Station. Water Board.

Covington, O.—Were to spend $3,000 on water works system. City Clerk.

Daltona, Fla.—A vote is to be taken on the water works question.

Davenport, Ia.—The water company will lay about four miles of mains.

Delphi, Ind.—Plans are to be made for increased water supply.

Downing, Wis.—A water works system may be installed. City Clerk Stoddard.

Duluth, Minn.—Alderman McEwen had a scheme to install water plant in Duluth Heights to supply that section.

E. Hampton, Mass.—The Water Commissioners favor a pumping station, engine, reservoir, etc., to cost $32,000.

E. Connersville, Ind.—Water works will be obtained. Jas. McCannon, Commissioner.

Ely, Minn.—Plans for water works are being drawn by T. F. McGilvray, Duluth, to cost $18,000.

England, Ark.—Plans for water works are being prepared. T. J. Hudson.

Floresville, Tex.—A bond issue of $14,000 for water works has been approved.

Genesee, Idaho.—It was voted to issue $16,000 bonds for water works. City Clerk Burr.

Gloucester, Mass.—The water mains may be extended to Bass Rocks.

Greensboro, N. C.—It was voted to issue $250,000 bonds for water works and sewers. The Mayor.

Halstad, Minn.—The water works will be rebuilt. Vil. Rec'r A. O. Ueland.

Harrisburg, Pa.—A contract for the filtration plant is to let by the end of the year. Water Department.

Havre, Mont.—Bids are wanted on December 31 for $26,500 water works bonds.

Hickory, N. C.—A vote may be taken on bonds for water works.

Hillsboro, Tex.—A better supply of water is to be obtained.

Hilton, N. Y.—There has been some talk of putting in water works.

Holton, Kan.—Plans for water works and sewers were made by Burns & McDonnell, Kansas City, Mo., to cost $50,000.

Homestead, Pa.—The water works plant is to be improved.

Huntley, Ill.—Plans have been made for water works to cost $10,000. City Engineer Prout, of Elgin.

Idaho Springs, Idaho.—The water and light plant may be enlarged.

Ipswich, Mass.—The water system may be extended. Water Comrs.

Jackson, N. H.—A water works system may be constructed. C. W. Gray.

Kansas City, Mo.—It was voted to issue $2,175,000 bonds for improving the water works. Mayor Reed.

Kinston, N. C.—Bids were asked for $100,000 water works bonds. The Mayor.

Knoxville, Tenn.—A committee will consider the question of municipal water works. Norman B. Morrel, Secretary.

Lacrosse, Wis.—The city may put in the driven well system of water works. President Board of Public Works.

Lawrence, Mich.—Bonds to the amount of $15,000 are to be issued for water works and electric lights.

Lewiston, Pa.—Plans for water works were drawn by J. M. Africa, Engr. Huntington, Pa. City Clerk Settle.

London, Ky.—It was voted to issue $15,000 bonds for water works. E. H. Hackney.

Marietta, O.—A test well may be sunk to obtain a new supply. Board of Public Service.

Nevada, Mo.—Plans for water works to cost $84,614 made by Burns & McDonnell, Kansas City, Mo.

New Britain, Conn.—Plans for 1904 include the laying of a number of large mains.

Nicholasville, Ky.—A vote will be taken on November 3 on $30,000 bonds for water works.

Northfield, Vt.—Plans for $50,000 water works were made by Jas. H. Holland, New York.

Philadelphia, Pa.—Estimates for 1904 call for $300,000 for laying mains and $280,000 to extend pipe lines. Bureau of Water.

Red Lake Falls, Minn.—Bids are wanted on November 15 for plans for water works. Cy. Clk. Toupin.

Rockford, Ill.—Contemplating an additional water supply.

St. Paul, Minn.—It is reported that about one mile of water main was to be laid on Snelling avenue.

Sandpoint, Idaho.—There has been talk of water works. F. E. Catlin, Clk.

Smith's Grove, Ky.—New works will be installed next spring. J. R. Kirby, president.

Stillwater, Minn.—There has been talk of city water works.

Sydney Mines, N. S.—Will probably install water works and sewers to cost $125,000. Town Clerk.

Tampico, Ill.—A vote is to be taken on the question of putting in water works. Town Clerk.

Tulsa, I. T.—Plans are to be made for water works.

Valley City, N. D.—It was stated that $4,000 bonds for extending water works were to be sold. Cy. Audr. Craswell.

Vinita, Ind. Ter.—Voted $85,000 bonds for water works and sewers. The Mayor.

Ward, S. D.—Water works have been contemplated.

Warsaw, Neb.—Will build $5,000 water works. Vil. Clk. Keller.

Youngstown, O.—The Board of Public Service accepted the engineer's report for a filtration plant. City Engineer Lillie.

CONTRACTS AWARDED

Alexandria, Pa.—Contract let by Alexandria Water Company to W. M. Powell & Co., for five miles of pipe, etc.

Atlantic City, N. J.—Contract awarded C. P. Allen General Contracting Company for improving the Absecon water station at $28,425.65.

Aurora, Ind.—Contract for 40,000 feet of pipe let to P. H. Porter, Clinton, Ky.

Clarkfield, Minn.—Contract for water works let W. I. Gray & Co., Minneapolis, at $7,600.

Colorado Springs, Colo.—Contract for extending the water works was let National Tube Co., Chicago.

Deadwood, S. D.—Bulger & Duffy has the contract for mains, sewers, etc., on Adams and Jackson streets.

Exira, Ia.—Contract for improving the water works awarded. Mayor Knapp.

Goodhue, Minn.—Contract for works let Des Moines Bridge & Iron Co. at $10,000.

Jasper, Ala.—Contract for water works awarded. The Mayor.

Lawrenceburg, Ky.—R. H. Porter, Clinton, has contract for water works.

Levis, Que.—Dussault & Power has contract for water works at $287,000.

Long Island City, N. Y.—Contract let Clinton Beckwith for 868 tons of water mains at $55,000.

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Los Angeles, Cal.—Contract for pumping engine for water works let Snow Pump Company, Buffalo, N. Y., at $24,872.

Oberlin, O.—Baldwin, Graham & Co., Cleveland, has the contract for filtration plant.

Onaway, Mich.—Contract let T. C. Brooks & Sons, Jackson, for water works.

San Bernardino, Cal.—Contracts for water works let the Machinery & Electric Co., Los Angeles, Cal.

Seattle, Wash.—C. J. Erickson has a contract for 10-inch C. I. main on 2d avenue

So. Milwaukee, Wis.—Contract let W. H. Wheeler & Co., Chicago, for extending intake pipe 1,500 feet.

Spring Grove, Pa.—W. B. Johnston has a contract for a reservoir.

Washington, La.—Contract let J. W. Sanders, Beaumont, Tex., for tank and 8,100 feet of c. i. mains.

Whitehall, Wis.—Contract for 1,200 feet of mains on Dewey street let Fetter, Baker & Neibuhr Company, La Crosse.

Winston, N. C.—Contract for dam and reservoir let S. S. Ordway & Sons.

LIGHTING AND TELEPHONE

Alpena, Mich.—The city will issue $100,000 bonds for a municipal electric light plant.

Avoca, Neb.—Bonds will be issued for a lighting plant.

Brownwood, Tex.—This city is considering the installation of a municipal electric light plant.

Buena Vista, Ga.—The city may put in an electric light plant. George R. Lowe, Recorder.

Bunkerhill, Ind.—The city is to construct an electric light plant.

Burlington, Vt.—May issue $58,000 bonds for the installation of a municipal electric lighting plant.

Canandaigua, N. Y.—Franchise for an acetylene gas plant let J. K. Rush, who will put down mains.

Columbia, Mo.—The Council will ascertain the cost of a lighting plant and water works. J. S. Bicknell, Clerk.

DeLand, Fla.—Franchise for a telephone system let E. L. Potter.

Douglas, Ga.—It was voted to issue $20,000 bonds for an electric light and water works plant.

Emporia, Kan.—May spend $10,000 on extending the electric light system. The Mayor.

Florence, Neb.—Planning for an electric light plant.

Frederickton, N. B.—It is stated that this place was to sell on October 15, $15,000 bonds for an electric light plant.

Germantown, O.—It is reported that $6,000 will be spent on an electric light plant.

Grand Haven, Mich.—May spend $10,000 on an electric light plant.

Greeley Center, Neb.—The installation of an acetylene gas plant here is probable.

Green Springs, O.—There has been agitation for a city electric plant.

Hartford, Conn.—The Street Commissioners may compel the placing of all electric wires underground.

Hillsboro, Ill.—There has been talk of a municipal electric plant.

Holyoke, Mass.—Will issue $36,000 bonds for the extension of the electric light plant.

Honolulu, H. I.—Governor Dale is interested in the proposition to place wires underground in the business sections. Supt. Public Works.

Horicon, Wis.—It was voted to issue $10,000 bonds for gas lights on the streets.

Jackson, O.—It is said that $1,500 bonds for improvements to the village electric light plant will be issued. Mayor Kibbee.

Jersey City, N. J.—Residents of the 12th Ward want the old pumping station turned into a municipal electric light plant.

Kenmore, N. D.—The city will build an electric light plant.

Lawrence, Mich.—There has been talk of putting in an electric light plant and water works.

Logansport, Ind.—The sum of $25,000 will be spent on the enlargement of the electric light plant.

Macedonia, Ia.—This place has been talking of an electric light plant.

Middletown, Ill.—It is proposed to erect a $5,000 electric light plant. A E. Abbott, Engr., Mason, Ill.

Milledgeville, Ill.—Contemplating an electric light plant.

Mohawk, N. Y.—This place is considering an electric light plant to cost $30,000.

Moro, Ore.—Bonds will be issued for an electric light plant.

Mount Ayr, Ia.—This place has been contemplating gas lights. Councilman Allyn.

Newport News, Va.—A committee of three has been appointed to consider the question of an electric light plant for the city.

Oakes, N. D.—There has been talk of an electric light plant.

Orangeville, Utah.—An electric light and power plant has been under consideration for this place and Castle Dale.

Ottawa, Ill.—There has been some talk of a municipal electric light plant.

Owatonna, Minn.—This place contemplates a municipal electric light plant.

Richland Center, Wis.—It was voted to issue $20,000 bonds to buy the electric light plant owned by G. H. Strong.

Rosedale, Ind.—It has been proposed to erect an electric light plant.

Sabetha, Kan.—The electric light plant may be improved. Supt. E. E. Rogers.

Salena, Ia. The city will put in a gas plant.

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Santa Ana, Cal.—It was voted to issue $60,000 bonds for an electric light plant.

Seattle, Wash.—New bids are wanted for the proposed municipal electric light plant. Board of Public Works.

Scotland Neck, N. C.—An electric light plant is to be installed. E. W. Trafford, Engr., Chamber of Commerce Building, Richmond, Va.

Sterling, Ill.—Considering the enlargement of the electric light plant. Electric Lighting Commission.

Terre Haute, Ind.—Acetylene Light Company incorporated at $10,000. Jon. S. Hunt, E. L. Sweet, etc.

Timmonsville, S. C.—Considering the construction of an electric light plant.

Valley City, N. D.—Bonds for the municipal electric light plant were rejected. Cy. Audr. Craswell.

Vidalia, La.—It was voted to issue $12,000 bonds for an electric light plant and water works.

Wautoma, Wis.—Bonds for an electric light plant will be issued.

Webster City, Ia.—Franchise for a gas plant was asked by J. M. Funk.

Williamsburg, Miss.—It is stated that $10,000 bonds for an electric light plant and water works will be issued. Mayor Williams.

Winnetka, Ill.—A village gas plant will be erected.

Winnipeg, Man.—A vote will be taken in December on $200,000 bonds for a city gas plant.

Woodville, Mass.—It was voted to issue $30,000 bonds for an electric light plant and water works.

Xenia, O.—Plans for the electric light plant are being made by H. C. Hubbell.

Contracts Awarded

Albion, N. Y.—Contract was awarded the Albion Light & Power Company for street light service at $65 per lamp.

Atlantic City, N. J.—Contract for street lights awarded the Atlantic City Electric Light & Power Company at $75 per arc lamp per year.

Bangor, Mich.—A contract for an electric light plant has been let to the Warren Electrical Co., Sandusky, O.

Barnesville, Ga.—Contracts for a light plant have been let as follows: Stanley Electric Co., Atlanta, generator, switchboard and exciter; R. D. Cole Mfg. Co., Newman, Ga., boilers; Hoovens, Owens, Rentschler Co., Hamilton, O., engine.

Benton, Wis.—The contract for an electric light plant has been let to David Morrow, Galena, at $4,100.

Berlin, Pa.—Contract for an electric light plant let Cyrus Musser & Son.

Celina, O.—The contract for lamps for the city has been let to the General Incandescent & Arc Light Co., New York, at $20,900.

Cheraw, S. C.—The contract has been let to the Standard Electric Co., Charlotte, N. C., for an electric light plant, at $16,772.

Culpepper, Va.—Contract for lighting the streets let George F. Major, Lacota, Va.

Dublin, Ga.—A charter for the Dublin Telephone Mfg. Co. has been asked for by A. Block & Bros. Capital, $100,000.

Elmore, Minn.—The contract for a gas plant for the village has been let to Lewis & Proctor Co.

Everett, Wash.—A fifty year lighting franchise has been let to the Everett Railway & Electric Co. by Marysville.

Harrisburg, Ark.—A charter for an electric light plant has been let to G. F. Garvey.

Johnstown, Pa.—A contract for 250 acres, for five years, has been let to the Johnstown Electric Light Co., at $40.00 per year, per lamp.

La Forge, Wis.—A ten year electric light franchise has been granted to B. C. Rosencrans.

Mankato, Minn.—Contract for city lighting let Mankato Gas & Electric Light Company for ten years at $65 for arcs and $19 for incandescents.

Monroe, La.—Contracts for an engine have been let to the Harrisburg Foundry & Machine Works, for a boiler, to the Sterling Company, for a generator, to the Westinghouse Electric Mfg. Co., and street lamps to the General Electric company.

Nortnampton, Mass.—Contract for street lighting was awarded the Northampton Street Lighting Company for arcs at $100 per year for all night service and 100 arcs to midnight at $74; to the Northampton Gas Company for 11 Welsbachs on midnight schedule at $24.60 per year.

Norwood, O.—Contract for the switchboard at the electric light plant let Sanborn-Marsh Electric Company.

Olympia, Wash.—Contract let Kilbourne, Clark & Co., Seattle, for light plant, at $10,500. Capitol Comn.

Randolph, Wis.—Contract for the city electric light plant let Langstadt & Meyer, Appleton.

Seattle, Wash.—Contract for wire and cable for the municipal electric power plant let Standard Underground Cable Company, Pittsburg; for water wheels to Pelton Water Wheel Company, New York; for 250 tons of 48 inch steel pipe to T. A. Gillespie & Company, Pittsburg.

Shenandoah, Pa.—A charter was granted the People's Electric Light, Heat & Power Co.

Two Harbors, Minn.—Crowley Electric Co., Duluth, let contract for machinery in village light plant.

Yazoo City, Miss.—Contract for city light plant let Harrisburg Fdy. & Machine Works, Harrisburg, Pa., for engines; Stanley Electric Mfg. Co., Pittsfield, Mass., for dynamos and arc lights.

York, Pa.—Contract awarded the Edison Electric Light Company for lighting the city at 11 cents per lamp per night.

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PUBLIC BUILDINGS

Findlay, O.—A $6,000 armory is to be erected. S. L. McKelvey.

Franklinville, N. Y.—A new jail may be constructed.

Grafton, N. D.—Plans for a $10,000 Carnegie library are being made by Hancock Bros., Fargo.

Harrisburg, Pa.—Plans were asked October 20 for a $50,000 school. Chairman Luce, Board of Education. Bids are wanted October 29 for a court house for Saline county. Board of Supervisors.

Harrison, Ark.—A $75,000 court house may be erected for Boone county. County Clerk.

Hastings, Neb.—Bids are wanted November 2 for a new post office. J. K. Taylor, Treasury Department, Washington, D. C.

Havre, Mont.—It was reported that a new jail will be erected.

Hendersonville, N. C.—A vote was to have been taken on October 24 on $30,000 bonds for a hourt house.

Iowa Falls, Ia.—Plans for a $10,000 library have been prepared. Omeyer & Thori, Architects, St. Paul, Minn.

Jasper, Tex.—Bids are wanted November 9 for a jail to cost $10,000. County Judge Barton.

Jennings, La.—Contracts will be let for a $20,000 public school as stated last month. City Clerk.

Johnson City, Tenn.—It is stated that $28,000 bonds were voted for a school, etc. Mayor Crumley.

Joplin, Mo.—Sheriff Owen recommends a new jail.

Kansas City, Mo.—Bids are wanted November 9 for extending the U. S. post office and court house. J. K. Taylor, Treasury Department, Washington, D. C.

Kent, Wash.—A vote was to have been taken on October 31 on the issue of $60,000 bonds for a court house.

Louisville, Ky.—Plans were soon to be started for a Carnegie library to cost $250,000.

Marlin, Tex.—There has been talk of a new city hall.

Meridian, Miss.—Bids are wanted November 7 for the Lauerdale County court house to cost $10,000.

Michigan City, Ind.—It is reported that $50,000 has been appropriated for a city hall.

New Castle, Ind.—Plans were prepared for an addition to the court house to cost $48,000.

New Haven, Conn.—Press reports speak of the bad condition of the city hall, and the need for a new one or for extensive repairs to the old. Mayor Studley has been inspecting the present structure to see just what is needed.

Oklahoma, I. T.—A vote will be taken in November on $100,000 bond issue for a court house. County Clerk.

Pambina, N. D.—A city hall and opera house has been under consideration.

Perryville, Mo.—Plans for a new $30,000 court house for Perry county are wanted on November 7. County Clerk C. F. Luckey.

Philadelphia, Pa.—Plans are completed for a new county court house to cost $600,000. Rankin & Kellogg, Architects, 1024 Walnut street.

Portland, Ore.—A vote was to have been taken on a bond issue of $100,000 for schools.

Providence, R. I.—Plans for a new Federal building are being made by Clark & Howe, Architects.

Reading, Pa.—It was reported that $300,000 bonds for a high school were to be issued. School Board.

Richmond, Ind.—A new hospital to cost $50,000 will be erected. City Clerk.

Rutledge, Tenn.—It was stated that $25,000 bonds for Grainger County court house are to be issued. County Judge A. F. Bryan.

San Antonio, Tex.—It is stated that $50,000 bonds for a school were voted.

San Bernardino, Cal.—Plans for an addition to the county jail are being made by Thos. Goff, Hargrave.

San Francisco, Cal.—A $500,000 library is to be erected at Stanford University by Mrs. Stanford.

Santa Ana, Cal.—It is reported that $50,000 bonds were voted for a city hall, school and fire station.

Shippensburg, Pa.—It is stated that $23,500 bonds for a high school will be issued. W. B. Mason.

Solvay, N. Y.—It is stated that this place has been contemplating a $20,000 library.

Spokane, Wash.—A vote may be taken on $250,000 bonds for a high school.

Topeka, Kan.—A manual training school is being planned. Board of Education.

Troy, O.—Plans for a school are being made by W. W. Shilling, Architect.

Turners Falls, Mass.—It is said that a $50,000 school and a $12,000 Carnegie library may be erected.

Utica, N. Y.—Bids are wanted on December 1 for a court house for Oneida county. F. T. Proctor, Second National Bank Building.

Washington, D. C.—Bids are wanted on November 9 for an addition to the Kansas City Federal building, to cost about $400,000. J. K. Taylor, Treasury Department.

Watertown, N. Y.—A $22,000 school is to be erected. Board of Education.

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Windom, Minn.—Plans are asked on November 17 for a $50,000 court house. Board of Commissioners.

Windsor, Ont.—A vote will be taken in January on an issue of $15,000 bonds for a city hall. City Clerk.

CONTRACTS AWARDED

Ames, Ia.—Contract was awarded H. W. Schleuter, 537 Marquette building, Chicago, for a $10,000 library.

Belton, Tex.—Contract was let B. D. Lee for a $15,000 high school.

Boston, Mass.—Contract was awarded the Wheaton Building & Lumber Company, 170 School street, for a $125,000 school.

Chicago, Ill.—Northwestern Construction Company, 78 La Salle street, has the contract for altering the county treasurer's office.

Cranston, R. I.—Contract for a school let to Frank G. Rowley, Pawtucket, at $36,600.

Darlington, S. C.—Contract was awarded to DeLeon & Lopez, Atlanta, Ga., for a new $45,000 court house.

Denton, Tex.—Contract awarded to Dennis Mahoney for an annex to No. Texas State Normal School at $38,175.

Dowagiac, Mich.—Contract let J. D. Nordelea for a library at $12,000.

Erie, Kan.—Contract for Neosho County court house, let to Donnelly & Hopkins.

Ft. D. A. Russell, Wyo.—Contract for nine buildings let to Russell-Sonders Construction Company, Colorado Springs, Colo.

Ft. Ethan Allen, Vt.—Contract for nine buildings let Denniston & Company, Rochester, N. Y., at $310,000.

Gallipolis, O.—Contract for Carnegie library let E. W. Hill, Columbus, at $12,000.

Guthrie, O. T.—Contract awarded to David Swank for $37,105 school by the Logan County high school trustees.

Hartford City, Ind.—Contract for $30,000 high school let P. H. McCormick & Co., Columbus, Ind.

Huntsville, Tenn.—Contract for Scott County court house let to Harper & Barnes, Cleveland, Tenn.

Jackson, Fla.—Contract for the Carnegie library awarded Owens Building Co.

Lancaster, Mass.—Contract awarded to Horace H. Lowe, 141 East street, Clinton, for a school at $35,000.

Marshall, Ill.—Contract for a high school awarded H. B. Walter at $31,000.

Martinsville, Va.—The lowest bid for the U. S. post office was made by King Lumber Company, Charlottesville, Va., at $27,378.

Mt. Pleasant, Ia.—Contract awarded Jas. Brown for a $10,000 library.

New York, N. Y.—Contract awarded for a library on E. 10th street to M. Reid & Co., 18 E. 20th street, at $67,000.

Noblesville, Ind.—Contract for rebuilding the court house awarded W. H. Johnson & Son, Indianapolis, at $8,765.

Oak Park, Ill.—Contract awarded Pillinger Bros., for a village hall at $53,337.

Portsmouth, N. H.—Contract for a high school awarded Sugden Bros. at $85,000.

SEWERAGE

Austin, Tex.—Have been discussing a plan for the sewer in Congress avenue.

Baltimore, Md.—It was stated that $17,700 would be spent on a sewer in Howard street.

Beloit, Wis.—Have been talking of extending the sewer system. City Engineer Caldwell.

Beverly, Mass.—It was reported that Knowlton and Prospect streets were to be sewered.

Bogota, N. J.—A trunk sewer may be built.

Centerville, Mo.—Surveys have been made for a new sewer system.

Chester, Pa.—A vote will be taken in February next on $200,000 bonds for sewers.

Cincinnati, O.—It was reported that Halstead, Addison, Eliza and Dixon streets were to be sewered. Ed. Henderson, Clerk.

Cleveland, O.—Will spend $15,000 for sewers and water connections. Peter Witt, City Clerk.

Clifton Heights, Pa.—Plans for sewers are being drawn by E. M. Harris of Darby.

Clinton, Ind.—Talking of a sewer system. J. W. Robb.

Denison, Ia.—Plans for a sewer system are being drawn by M. Tshirgi of Dubuque.

Des Moines, Ia.—Resolutions called for a 12-inch clay pipe sewer in Forest avenue. City Clerk E. R. Bennett.

Dunmore, Pa.—It is stated that $25,000 bonds for sewers have been sold.

Earlville, Ill.—Plans for the sewer system have been made by the Iowa Engineering Company, of Clinton, Ia.

Edwardsville, Ill.—It was reported that a $11,000 sewer system would be built.

Fairview, Mich.—A sewer system will be planned.

Fremont, O.—It is stated that Juliet and Wood streets will probably be sewered.

Glenolden, Pa.—Plans for a $30,000 sewer system will be made by E. M. Harris, Darby.

Harrisburg, Pa.—It is stated that $10,000 will be spent on sewers.

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Hazleton, Pa.—Cost of a sewer system in Elm street has been estimated by the City Engineer.

Hyattsville, Md.—The cost of a sewer system will be ascertained. Mayor C. A. Wells.

Machias, Me.—A $15,000 sewer system will be constructed.

McKeesport, Pa.—It was proposed to issue $33,000 bonds for sewers. City Engineer White.

Marlboro, Mass.—It was reported that sewers and a sewage bed was to be built. City Engineer Bigelow.

Minonk, Ill.—A local improvement board has been formed and sewer plans and improvements will be made. City Engineer Davidson.

New York, N. Y.—$600,000 worth of sewers are to be constructed in Bay Ridge, Brooklyn.

Northampton, Mass.—Plans for extending the sewer system were drawn by City Engineer Patterson. Cost placed at $100,000.

Oxford, O.—It was stated that a vote was to be taken on the issue of bonds for a sewer system.

St. Paul, Minn.—The cost of a sewer in St. Anthony Park was placed at $350,000 by City Engineer Rundlett.

Savannah, Ga.—Petitions were circulated asking for sewers in the center of the city.

Shawano, Wis.—Surveys have been made for sewers.

Sharon, Pa.—Plans for a sewer system are being drawn by A. F. Damon, Darby.

Spencer, Mass.—Talking of a sewer in Paxton street.

Springfield, Ill.—The building of several sewers has been under consideration.

Taunton, Mass.—A sewer will be placed in Broadway. Board of Sewer Commissioners.

Westerly, R. I.—There has been talk of a sewer system. Engr. Gray.

West Hoboken, N. J.—New bids were to be asked for the sewer on Palisade avenue.

CONTRACTS AWARDED

Alma, Mich.—Ray & Clark have the contract for a sewer at $3,264.

Amsterdam, N. Y.—Contract for a sewer system let to James Enveri & Co., at $3,339.

Bayonne, N. J.—Contract, Henry Burns, 548 Montgomery street, for a sewer in 13th street.

Brackenridge, Pa.— Contract for four sewers let to W. H. Norris & Co., of Tarentum.

Chicago, Ill.—Contract for six sewers let to Nash Bros., 84 La Salle street.

Chicopee, Mass.—Contract for a sewer on Broadway let to John B. Sullivan at $16,000.

Columbus, O.—Sewer contracts let to Frank J. Fisher at $8,389 and Lewis Lind at $1,583.

Detroit, Mich.—Thos. G. Whittaker & Son, 189 Seldon avenue and Jas. Grant, 93 Garfield avenue, have sewer contracts.

El Paso, Tex.—Fassett & Kelly have contract for sewer at $23,227.

Erie, Pa.—Contract let to Edw. Driscoll for 360 feet of 12-inch tile sewer at $1.50 per foot for straight pipe, $3 for branch pipe, 40 cents for 6-inch pipe and $50 for manholes. Contract let Dennis O'Brien for 360 feet of 9-inch drain at $1.40 per foot.

Ft. Bliss, Tex.—Contract for sewer system let R. D. Ritchie and J. M. Flores, El Paso.

Ft. Brown, Tex.—Contract for sewer system let F. J. Sargent, Jennings, La.

Geneva, O.—Contract let to C. O. Simmons for lateral sewers at $22,934.

Greenville, Pa.—Contract let J. H. McCafferty for sewer work.

Hudson, Mass.—Gow & Palmer, Boston, has contract for sewage pumping station at $5,466.

Long Branch, Cal.—Contract let to William Walker for outfall sewer at $19,750. City Engineer Foster.

Mankato, Minn.—Contract for N. Second street sewer let to John McCall at $2,780.

Moline, Ill.—Contract let Plambeck & Berglund for drain in 26th street.

Moscow, Idaho.—J. C. Broad, Spokane, Wash., has contract for sewer system at $11,765.

Newark, O.—Contract for sewer in Woods avenue let to W. R. Davis and one in Hover street to F. H. Kinney.

Newcastle, Ind.—Contract for sewers let to Frye, Voughn & Co., Greenfield.

Owensboro, Ky.—Henry Eigenmann, Rockport, Ind., has the contract for sewer at $3,976.

Palmer, Mass.—Contract for South Main street sewer let to Seymour & Newell, Springfield.

Phillipsburg, N. J.—Contracts for sewers awarded to George H. Hardner, Allentown, Pa., and B. D. Myers, Wilkes-Barre, Pa.

Portland, Me.—Booth & Co. has contract for Section 1 of west side sewer at $6,000.

Rushville, Ind.—The lowest bid for sanitary sewers was made by Thos. Bridges & Sons, Wabash.

San Jose, Cal.—James Ward was awarded the contract for a sewer in 7th street at $1,990.

Sauk Center, Minn.—Contract awarded to Fraser & Elliott, Rochester, Minn., for 12,927 feet of 8 to 12-inch sewers.

Seattle, Wash.—Contract let the Coast Concrete Company for sewer in 30th avenue, South.

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Sharon, Pa.—Contract for sewers awarded William McIntyre & Sons, at $22,000.

Slayton, Minn.—Lenes & Hegestad has contract for 10-inch sewer.

Spokane, Wash.—Lowest bid for the 3d avenue sewer was made by Peter Costello at $14,200.

Springfield, Ill.—Contract for sewer in S. 2nd street awarded to Nelch & Patterson.

Springfield, Mass.—Contract for sewer in Riverdale street awarded to F. T. Ley & Co.

Virginia, Minn.—Contract for sewer system let P. McDonnell, 124 West Superior street, Duluth.

Wapakoneta, O.—Contract for sewer in Dist. 3 let to Wentz & Howell.

West Springfield, Mass.—Contract awarded F. T. Ley & Co., Springfield, for sewer in Riverdale street.

MISCELLANEOUS

Atlanta, Ga.—It is stated that $2,000 will be spent on a septic tank to dispose of the night soil. Contract for 7,000 bbls. cement let Sciple Sons at 58 cts. a pound.

Bloomington, Ill.—Reports state that garbage disposal is being considered. Alderman O'Connell.

Columbus, O.—It has been proposed to issue $7,000 bonds for street signs, which are much needed. City Engineer Griggs.

Duluth, Minn.—The press reports stated that the question of garbage disposal has been under consideration. Health Board.

El Paso, Tex.—Considering the disposal of the sewage.

Hartford, Conn.—Plans have been made for sewage disposal beds.

Jackson, Mich.—The contract for a sewage purification plant was let to E. J. Tobin & Co., at $23,718.

Jacksonville, Fla.—Address Judge A. O. Wright concerning a garbage plant.

Logansport, Ind.—Contract for the Gault Ditch was let to Robert C. Hillis at $58,243. It will be 24 miles long.

Manchester, Conn.—Plans for sewage disposal have been made by T. H. McKenzie, 75 Pratt street, Hartford.

New York, N. Y.—The city will spend $1,000,000 on the botanical garden in Bronx Park.

Oakland, Cal.—The Health Board will make an effort to obtain a garbage crematory.

Pekin, Ill.—It is said that $40,000 bonds were sold for park improvements.

Portsmouth, O.—The city authorities have been considering the question of garbage disposal.

Ridgewood, N. J.—The contract for seven miles of sewers, filter beds and septic tanks was let to Callery & Murphy of North Hudson.

Rockdale, Conn.—This place has been considering the question of sewage filtration and disposal. Mayor Loomis.

St. Louis, Mo.—It is stated that $10,000 may be spent to improve Forrest Park.

St. Mary's, O.—A sewage disposal system and sewers may be constructed.

Sandusky, O.—Figures on the cost of a garbage crematory were to have been obtained. City Auditor Wagner.

Seattle, Wash.—The contract for dredging the New Whatcom harbor was let to the Seattle Bridge Company.

Sioux City, Ia.—The aldermen have been discussing the question of garbage disposal. The Mayor.

Syracuse, N. Y.—The city has acquired land for a park and will improve it.

Vancouver, B. C.—The press calls for the use of sprinkler cars on the trolley lines.

(End.)